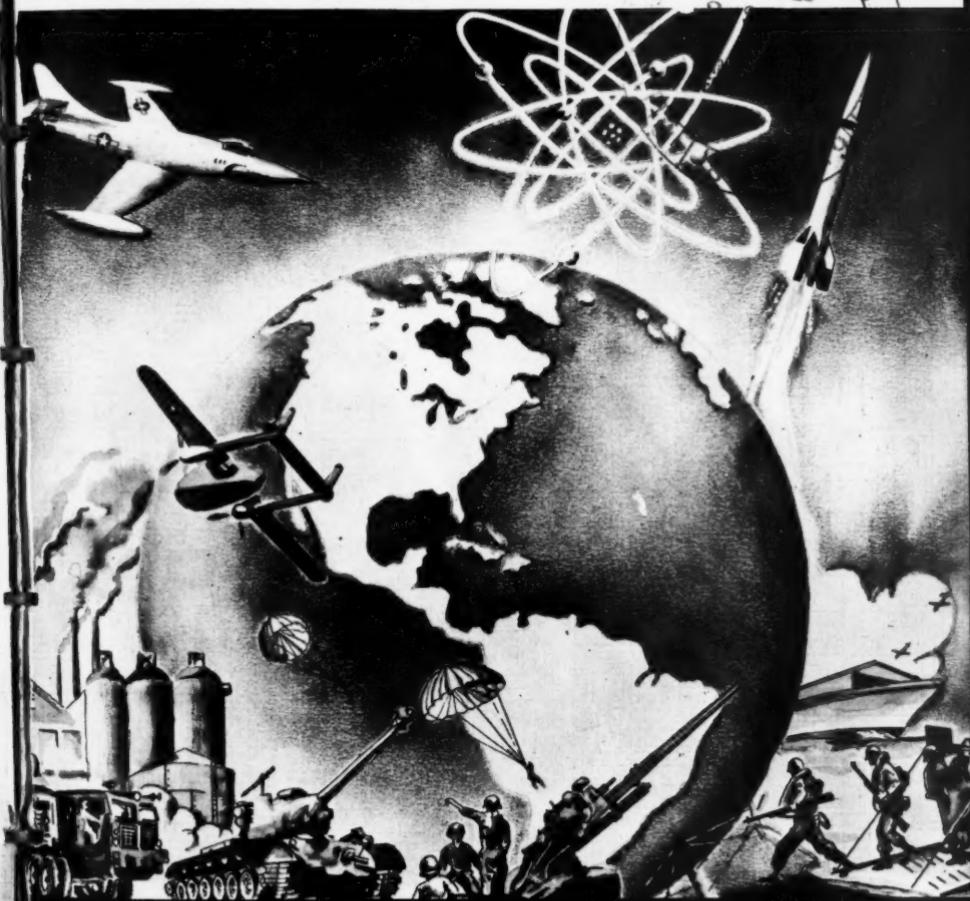


MILITARY REVIEW



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Unless otherwise indicated, the views expressed in the original articles in this magazine are those of the individual authors and not necessarily precisely those of the Department of the Army or the U. S. Army Command and General Staff College.

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This copy is not for sale. It is intended for more than one reader.
PLEASE READ IT AND PASS IT ALONG

ARMOR IN THE NUCLEAR AGE

Richard M. Ogorkiewicz

THIRTEEN years ago the explosion of the first two atom bombs brought an end to World War II, in which armor played such a prominent part, and introduced the age of nuclear power. Since then nuclear power has come to exert an ever-increasing influence in all spheres of military activity. In the particular case of armor, what precise effect has it had so far and what further developments is it likely to bring about?

Interestingly enough, in the immediate post-World War II period the influence of the nuclear weapons on armor was negligible. At the time their influence and potential employment were limited to strategic air warfare. Moreover, for several years—until the first Soviet nuclear explosion in 1949—the possession of nuclear weapons was confined to the United States Strategic Air Force.

Thus for a time the development of armor was influenced by other considerations far more than by nuclear weapons. The principal factors were compounded of earlier theories on the employment of armored forces and of the more recent developments in the field of antitank weapons.

The existing theories consisted of two which were compatible and complementary and one which was largely opposed to them. Of the first two, one maintained that the principal role of tanks was still that of an auxiliary to the infantry. The other continued to regard armored forces as a mobile arm with a limited role. Be-

tween them they divided armored units into two specialized categories, one for close infantry support and the other for mobile operations of limited scope. The third theory, which was largely opposed to the other two, advanced the use of tanks within mechanized formations and the latter as the principal element in ground warfare.

Contrasting Policies

When the armies emerged from the post-World War II period of reorganization it became clear that the first two theories found continued favor in the United States, and that the third had won in the Soviet Union. Britain and France, the only other countries left after World War II with modern armored forces of any size, occupied an intermediate position. Both attached greater importance to their tanks than the United States was inclined to do at the time, but neither accorded to armored formations anything like the importance their counterparts enjoyed in the Soviet Army.

In practice the post-World War II US policy with respect to armor amounted to a dispersion of the majority of tanks among the infantry divisions. Only one understrength armored division was retained. There were serious doubts about the future of tanks in general, generated by the appearance of rocket-firing planes and the development of new infantry antitank weapons such as rocket launchers and recoilless rifles.

Intensive development in the direction of lighter, more efficient vehicles and reduced logistical dependence are imperative if armor is to realize its full potential and effectiveness in the nuclear age

In contrast the Soviet Army continued to attach great importance to its armored forces which had played such a decisive part in the Soviet advance into the heart of Europe in the latter part of World War II. Not only were they maintained in strength but, in striking contrast to the contemporary US policy, the proportion of armored formations was increased greatly in relation to the rest of the Soviet Army. Within five years of the end of the Second World War the total of reorganized armored formations reached 60, which represented about one-third of the Soviet Army and its principal striking force. For a time these divisions formed the chief military asset of the Soviet bloc and, as some acute political observers already have pointed out, an effective counterbalance to the United States possession of the atom bomb by their threat to the bordering countries.

Western Revival

The Soviet emphasis on armor and the realization of the need for an alternative to the undue reliance on atom bombs for the defense of western Europe led to a gradual revival of armored forces outside the Soviet Union. The renaissance was assisted greatly by the Communist invasion of Korea in June 1950, when a few battalions of North Korean manned Soviet tanks disproved many of the exaggerated contemporary claims about the obsolescence of armor.

Mr. Richard M. Ogorkiewicz is the author of "The Evolution of Armored Tactics" which appeared in the February 1958 issue of the MILITARY REVIEW. He was graduated in mechanical engineering from the Imperial College of Science, London University, in 1946, and subsequently was engaged there on research and lecturing. He has held a number of assignments with the Ford Motor Company in England, and has made a special study of armored vehicle development. Mr. Ogorkiewicz now is with the Rootes Group of London where he is engaged on long-term automotive design projects.

In the late forties and early fifties, the countries which formed the North Atlantic Treaty Organization, as well as the uncommitted nations, began to rebuild their armored forces. Within NATO and other allied countries the process was assisted materially by the mutual security program, under which considerable quantities of armored matériel were furnished by the United States, and the Soviet bloc was no longer alone in emphasizing the value of armored formations. The value of tanks used within versatile armored forces was now also stressed by Western armies, and particular importance was attached to them as an antidote to Soviet armor, in keeping with the old maxim that the best defense against a tank is another tank.

The Western revival of armor barely had begun when two new factors appeared on the scene. One was the development of the hydrogen bomb heralded by the first United States thermonuclear explosion in 1952, and a similar Soviet explosion in 1953. The other factor was the development of smaller nuclear weapons adaptable to tactical use.

Hydrogen Bomb

The tremendous power of the hydrogen bomb opened the possibility of inflicting damage on a vast territorial scale and made it probable that an all-out war with nuclear weapons against an enemy armed with similar means would lead to mutual suicide on a national scale. In such a context the role of the ground forces, armored or otherwise, shrank to negligible proportions. Some, henceforth, jumped to the conclusion that ground forces should be restricted to a light frontier cordon, or "trip wire" as it was called, which could set off the nuclear weapons of mass destruction. This implied basing *all* defense to aggression on the threat of fearful reprisals with nuclear weapons—a policy epitomized by the concept of "massive retaliation." The only role remaining

to armor in this extreme situation would have been that of a mechanized constabulary.

A more valid conclusion from the devastating power of the thermonuclear weapons would have been that in face of an enemy armed with similar weapons they were useless as an instrument of national policy, except in the supreme role of a deterrent to the use of similar weapons.

the smaller ones opened the possibility of tactical employment of nuclear power which would not, perhaps, incur the same frightful consequences. Tactical nuclear weapons also opened new vistas for armor.

The appearance of tactical nuclear weapons was, at first, suggested as particularly favorable to the NATO powers in view of their continued weakness in



The US *M48* tank

Otherwise, outside their proper role of a mutual deterrent, the value of nuclear weapons of mass destruction became highly questionable for, short of an all-out war of annihilation, their use would have worse consequences than whatever was to be countered.

Tactical Nuclear Weapons

In contrast to the suicidal implications of the more powerful nuclear weapons,

other armaments and the advantage they enjoyed due to the initial US lead in this field. Although enthusiasm for tactical nuclear weapons has been proportional to the distance from the possible scene of application, all NATO countries have been forced to rely on them increasingly because of their common failure to develop other—safer but more arduous—ways of opposing aggression.

The early hope that tactical nuclear weapons alone would counterbalance superior Soviet ground forces and make possible nuclear warfare limited in scope and magnitude was, to some extent, a delusion. In particular, the possibility of restricting the employment of nuclear weapons to a particular set of targets and some arbitrary yield range has remained very doubtful.

But if the broad issues remained in doubt, the introduction of tactical nuclear weapons proved clearer in relation to armor and other ground forces. To start with, and in contrast to the strategic nuclear weapons, the smaller tactical types implied the continuation of effective ground forces. At the same time, however, they called for a radical transformation.

Operational Postulates

The principal impact of tactical nuclear weapons has been on the mode of tactical deployment. In their presence the time-honored massing of troops became an invitation to wholesale destruction, and to escape this fate dispersion became a necessity. In consequence, a more resilient disposition in depth was indicated in place of the untenable static defense lines while their offensive counterpart in the shape of the outmoded massed breakthrough would be replaced by diffusive penetration. These new conditions have put a premium on highly mobile forces capable of operating in small self-contained units which could make up for the low troop density on the battlefield by their mobility and firepower and which could better evade destruction by keeping the situation fluid.

The postulates of effective operation in face of tactical nuclear weapons clearly favor armored forces, whenever mountainous or jungle terrain does not preclude their employment. For one thing, the vehicles of the armored forces with their armament and communication equipment provide the necessary basis for mobile

ground tactics and effective controlled dispersion. At the same time they assure a relatively high ratio of weapon power to manpower. Moreover, the same vehicles offer the possibility of effective movement in relative proximity to nuclear explosions by virtue of their inherent protection against blast and radioactivity. In consequence, armored forces, suitably organized and equipped, emerged as potentially most useful under conditions of tactical nuclear warfare.

Suggested Organization

The type of unit which has been proposed by some to fit the tactical employment of nuclear weapons are small self-contained armored battle groups organized around nuclear missile launchers as the primary weapons. Such groups might be exemplified by battalion size units each consisting of a battery of self-propelled launchers for rockets with nuclear warheads, supported by a company or two of light tanks or armored cars for medium distance security and one or two rifle companies in light armored personnel carriers for close-in employment.

Small, highly mobile armored battle groups of this type could operate effectively even against numerically superior forces. However, as both sides would ultimately possess them, their employment would lead to the impossible situation of small, widely dispersed units stalking each other with overpowered weapons and pulverizing the country around them in the process. Thus even if the tactical employment of nuclear weapons did not start a disastrous all-out nuclear war, it would, in populated districts, kill off the population which ostensibly was being defended. In other words, complete reliance on nuclear weapons implied by such units would destroy the object of defensive ground forces and much of their value in general. What is more, an irrevocable commitment to nuclear weapons in the organization of tactical units not only would

make their tactical employment inevitable, but increase the probability of the nuclear holocaust.

The Ultimate Role

At the same time it is inconceivable to dispense with tactical nuclear weapons, for a definite need must remain for them as it does for strategic nuclear weapons—as a deterrent to the use of similar weapons by the enemy. Thus the ultimate

ployment which would tempt the enemy to exploit his nuclear weapons and run the risk of wholesale destruction.

Under such circumstances, where the threat of tactical nuclear weapons will persist but where they may not necessarily be used, the value of armored forces will be greater than ever. On them, in fact, must devolve much of the ground defense in any territorial conflict, that is, defense against aggression aimed at con-



The US *M41* tank

role of tactical nuclear weapons is most likely to be that of a complement to ground units, which they would protect by their deterrent threat, rather than the basis of their weapon power under all circumstances.

But even if tactical nuclear weapons are held back in support of their threat will continue to hang over combat units. In consequence combat units will be compelled to operate dispersed and avoid such de-

quest of territory with its population and material wealth, as opposed to a war of annihilation made possible by the advent of strategic nuclear weapons.

In this situation armored forces should consist of hard-hitting, small, mobile groups composed of heavy self-propelled weapons, tanks, and infantry in armored carriers. Each group should form a versatile mechanized ground weapon system capable of a variety of missions and sus-

tained operation over wide areas. Spread out in strength over critical sectors the role of the armored battle groups would be to pounce swiftly upon the aggressors (in all probability composed of similar units) and to beat back attempts at local penetration. Their primary aim would be to combat aggressor forces directly with skillful, mobile tactics and superior equip-

ment and in the direction of smaller self-contained armored units, as shown by the US armored cavalry regiments, the regiments of the Soviet tank divisions, and the French *Regiments Inter-armes*. But the small, versatile armored units, self-sufficient tactically and administratively, which are indicated by the latest operational concepts are still to be accepted



The US *M59* armored infantry vehicle

ment and thus check aggression on the spot and in a nonsuicidal way.

The potential value of armored forces will not be fully converted into fact, however, until their equipment and tactics as well as organization have been brought in line with the demands of the new situation. As it is, few of the necessary developments took place during the first nuclear decade and progress since has lagged behind the slow realization of the potential value of armor.

However, there have been a few moves

generally. In fact, there have been some regressive moves in the opposite direction. This is clearly illustrated by the British armored units experimented with since 1955 which are intended as specialized limited-role formations of the "all-tank" type and which are the antithesis of the versatile mixed armored battle groups envisaged for the future.

Equipment Situation

On the equipment side progress in tank design during the first nuclear decade

amounted to little more than refinement of basic designs evolved toward the end of World War II. The basic type of tank remains the medium of approximately 40 tons, armed with a high velocity gun of three- to four-inch caliber, which in essence originated with the German *Panther* medium tank of 1942. In support of the medium there continues the heavy gun tank which was introduced during World War II by the German *Tigers* and the Soviet *Stalin* and which has been perpetuated since by improved versions of the latter and the British *Conqueror* and United States *M103* tanks armed with 120-mm guns.

Lighter and more mobile tanks have been advocated periodically as the answer to the pressing need for greater over-all mobility but with little practical effect. Even in the United States, where such great progress has been made since World War II in airborne operations, no battle-worthy, air-transportable tank was evolved until comparatively recently. The one notable exception to the general trend, the French *AMX* lightweight tank, indicates what can be accomplished by departing from the rut of established practices and thinking the entire problem out again.

One sector of armored equipment where genuine progress has been made in several countries since 1945 is that of armored personnel carriers. The absence of cross-country carriers had been the bugbear of earlier armored formations and the overdue introduction of this type of vehicle finally made it possible to combine riflemen with tanks and other self-propelled heavy weapons effectively. In short, the development of armored carriers has made it possible to create effec-

tive mixed armored units and thus fulfill one of the principal requirements of tomorrow.

The Need for Mobility

The introduction of armored personnel carriers also increased the over-all cross-country mobility of armored units and thus brought them a step further in the right direction. But their development barely has touched the range of possibilities and the many urgent needs.

Among the most important points are the exploitation of new weapons and the development of more efficient vehicles. The first includes the possibility of guided missile armed tanks which could replace the current heavy gun tanks with a substantial weight saving. The second point possibly would involve a shift to diesel power and should reverse the unfortunate trend toward continuously higher fuel requirements—the trend which has reduced vehicle operating efficiency to well below 20 ton-miles per gallon and which has increased fuel requirements of armored divisions to more than 300,000 gallons per 100 miles. Greater vehicle efficiency could do much to improve this deplorable situation, increase operational endurance, and reduce the dependence on the vulnerable supply lines which are the Achilles' heel of armored formations.

Intensive development in the direction of lighter, more efficient vehicles and reduced logistical dependence are, in fact, imperative if armor is to realize its full potential in the nuclear age. It needs this development urgently to further increase its combat mobility which, combined with weapon power, is the basis of its effectiveness and continued importance.

THE UNITED STATES NAVY

Pictorial material for this article was furnished by the Department of the Navy, Washington, D. C.—Editor.



Department of the Navy seal

THE Navy Department of the United States was created by Congress on 30 April 1798. Prior to that time the Army and the Navy had been managed by the Secretary of War.

The "Bureau System" was inaugurated by 1842, and by 1942 there were seven bureaus which carried the major part of the Navy's administrative burden during World War II and which are essentially the same today.

Of these seven existing bureaus, Naval Personnel, Ordnance, and Aeronautics are "line" bureaus and are headed and manned by line officers. Yards and Docks, Ships, Supplies and Accounts, and Medicine and

Surgery constitute the "staff" bureaus which are headed and manned by staff corps officers or technical specialists. The four bureaus of Ships, Ordnance, Aeronautics, and Yards and Docks often are referred to as the "material" or "technical" bureaus and correspond to the technical services of the Army in this sense.

Mission and Organization

The Navy's mission is *to gain, maintain, and exploit control of the sea*. Types of warfare and operations in which the Navy is expected to engage—in fulfillment of its mission—are:

1. Combat operations at sea, which include the operation of sea-based aircraft and land-based naval aircraft.
2. Land operations essential to the prosecution of a naval campaign.
3. Air operations as necessary for the accomplishment of objectives in a naval campaign.

The mission of the Navy is tied closely to that of the Army in that projection overseas of Army forces remains a major task for sea transport. If our ability to utilize ocean transport were lost, it is doubtful that our forces could survive, and it is almost certain that without vital imports brought in by surface ships our war industries could not function.

To carry out the mission outlined above, the Department of the Navy consists of three principal parts:

1. *The Operating Forces of the Navy* which comprise the several fleets, seagoing forces, sea frontier forces, district forces, Fleet Marine Forces, the Military Sea Transportation Service, and such shore activities of the Navy and other

Prepared to fulfill its mission of being in constant readiness to strike quickly with decisive power at any time, any place, the United States Navy is armed with the newest weapons, equipment, and detection methods



The United States Naval Academy

forces and activities as may be assigned to the Operating Forces of the Navy by the President or the Secretary of the Navy.

2. *The Navy Department* is the central executive authority of the Department of the Navy located at the seat of the Government and comprises the bureaus, boards, and offices of the Navy Department, the Headquarters, US Marine Corps, and the Headquarters, US Coast Guard, when operating as a part of the Navy pursuant to law.

3. *The Shore Establishment* which comprises all activities of the Department of the Navy not assigned to the Operating Forces of the Navy and not a part of the Navy Department. This establishment includes those operating forces of the Marine Corps which are not assigned to the Operating Forces of the Navy or to a unified or joint command.

Training

The Navy's rigid training standards are carried out at numerous schools and train-

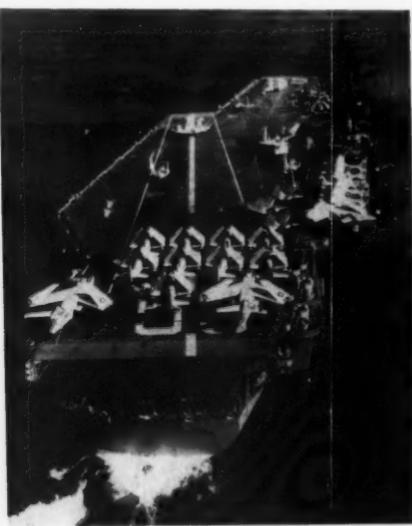
ing stations including the United States Naval War College located at Newport, Rhode Island, the United States Naval Postgraduate School, Monterey, California, and the United States Naval Academy, Annapolis, Maryland.

Also included in Navy training are such important fields as communication schools, engineer training, underwater demolition, and aviation. Science also has a major role in naval projects.

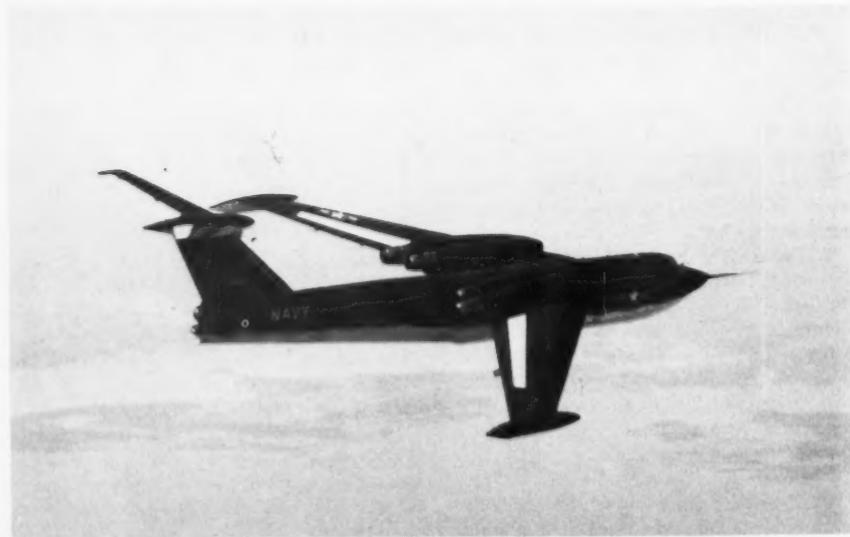
Conclusion

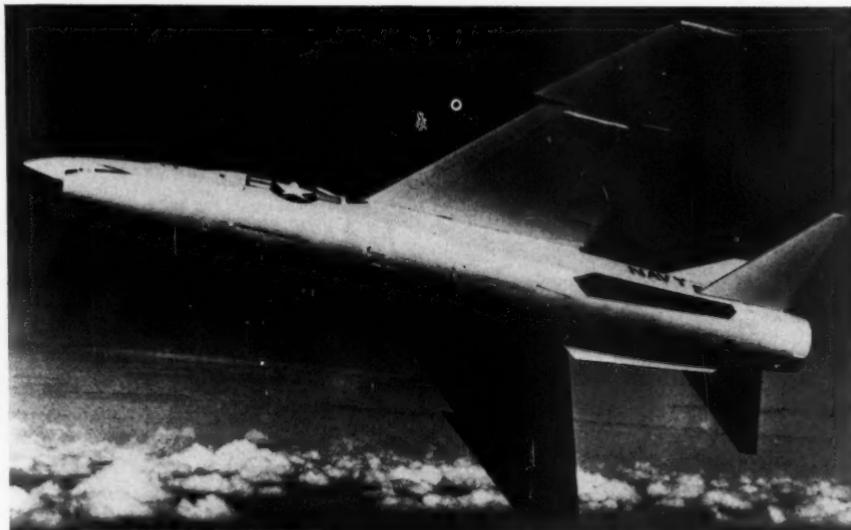
In peace and in war—regardless of new weapons, atom bombs, guided missiles, and supersonic aircraft—the Navy's job of controlling and directing the affairs and operations of 973 ships and approximately 670,000 officers and men remains a vital part of our national defense.

In order to carry out its responsibilities effectively the Navy maintains and operates the matériel and installations indicated in these official United States Navy photographs.

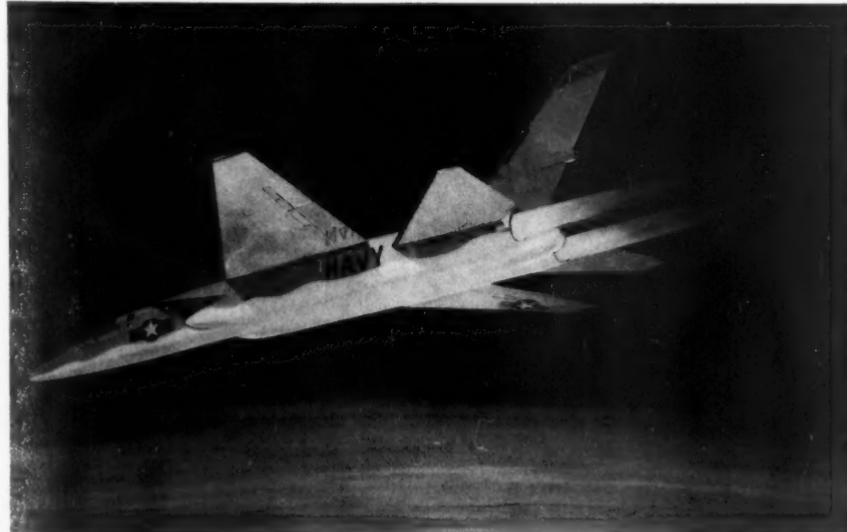


Above, left, is the swept-wing *F11F-1 Tiger* Navy jet fighter which can carry air-to-air and air-to-ground missiles. Above, right, the *USS Forrestal* aircraft carrier heads out to sea on maneuvers. Below, the *P6M Martin Seamaster*, high-speed minelayer, has a rotary mine door in the hull where mines, camera pod, or other weapons are carried.





A faster and higher-flying version of the *F8U-1 Crusader*, the *F8U-2* Navy jet fighter above can achieve speeds in excess of 1,000 miles an hour and yet land on some 200 feet of carrier deck. Below, the *A3J-1*, North American carrier-based, twin-jet aircraft, will provide the fleet with an all-weather, carrier-based attack weapon system.





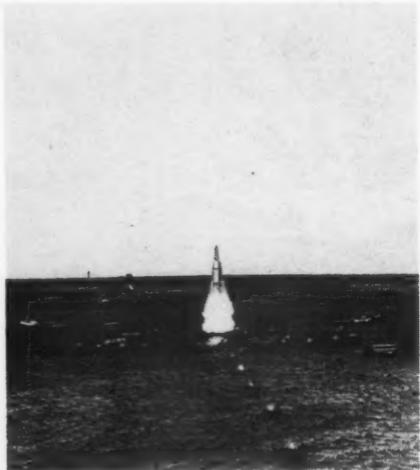
The *F4H-1*, above, is the Navy's first supersonic, two-seat, twin-jet, all-weather fighter. It carries air-to-air missiles and also is capable of long-range delivery of conventional and nuclear weapons. Below, is the *Mark II*, 20-mm automatic airborne cannon, in the *Mark I* pod, attached to the bomb rack of an *A4D-2* aircraft.



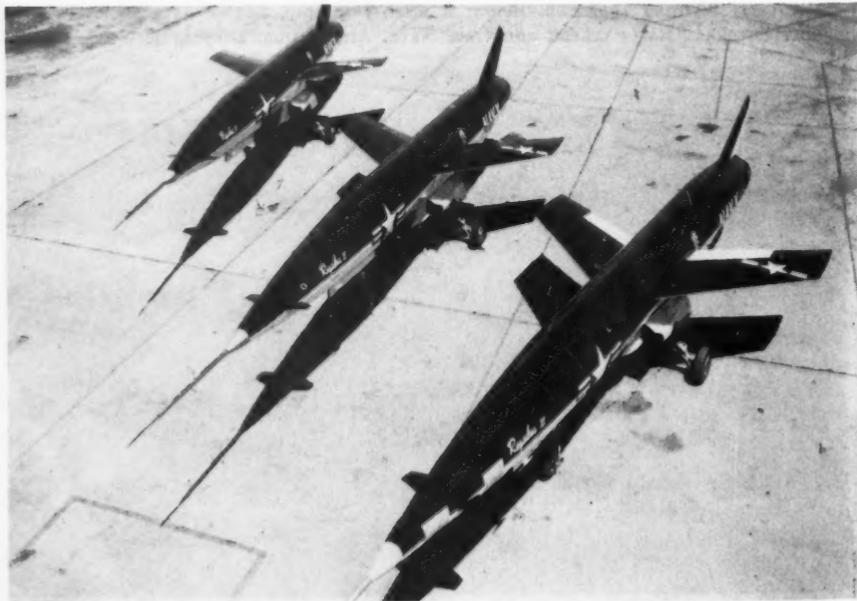


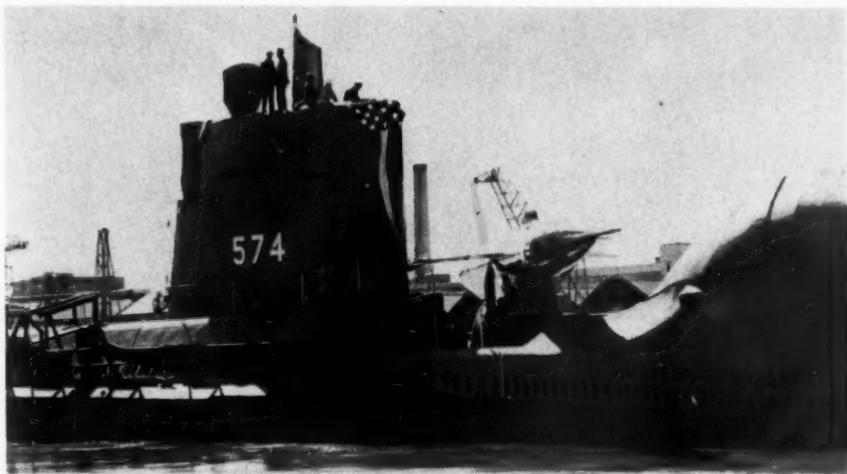
Flying over the *USS Oriskany* is the *Pegasus*, above, a special radar configured Navy version of a *Super Constellation* and the first WV-2 type aircraft assigned to an air-borne early warning squadron. Below, a ZS2G-1 airship, newest type to use dacron fiber envelope, starts takeoff run from Naval Air Station, Lakehurst, New Jersey.





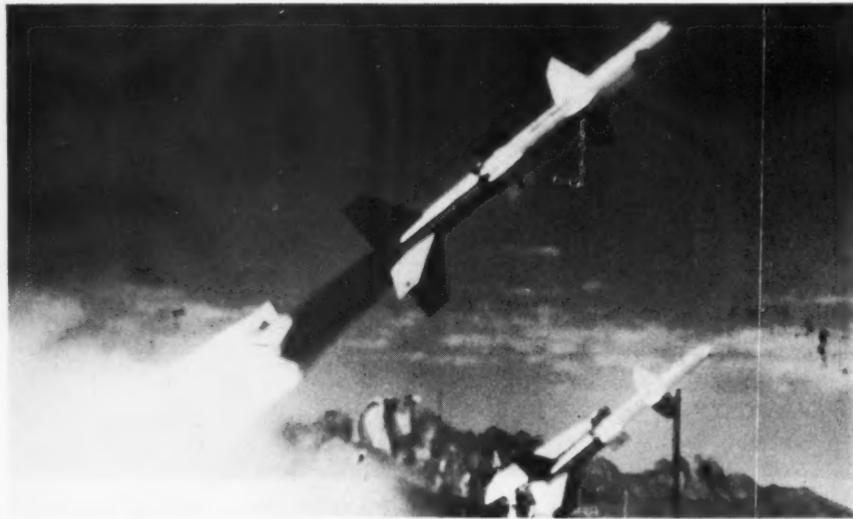
Above, left, is a test vehicle of the Navy's *Polaris* missile test program as it clears the surface of the ocean. On the right, above, is the *Regulus* being launched from the *USS Princeton*. Three of the Navy's *Regulus II* test vehicles are shown below.





Above, the *Regulus II* is shown on the starboard side of the *USS Grayback* guided missile submarine. Below, is an artist's conception of the guided missile submarine, the *SSG (N) FBM*, scheduled for construction as part of the 1959 shipbuilding program.



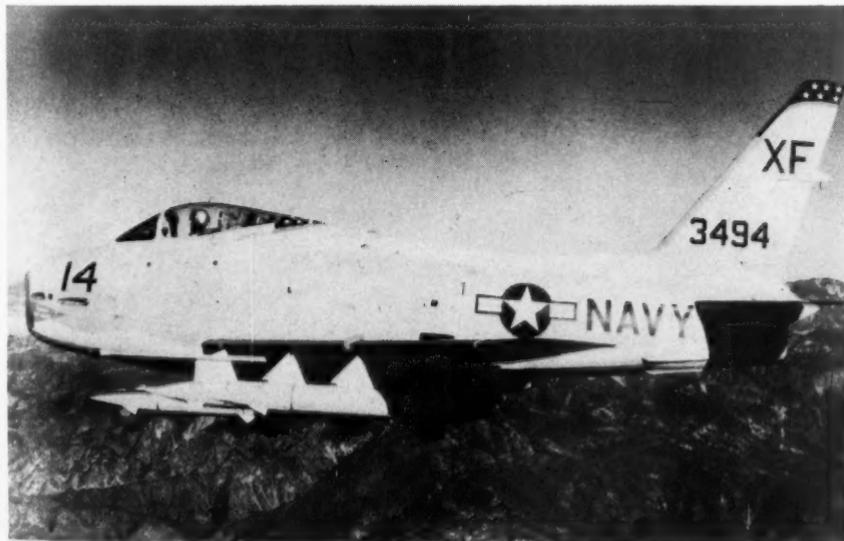


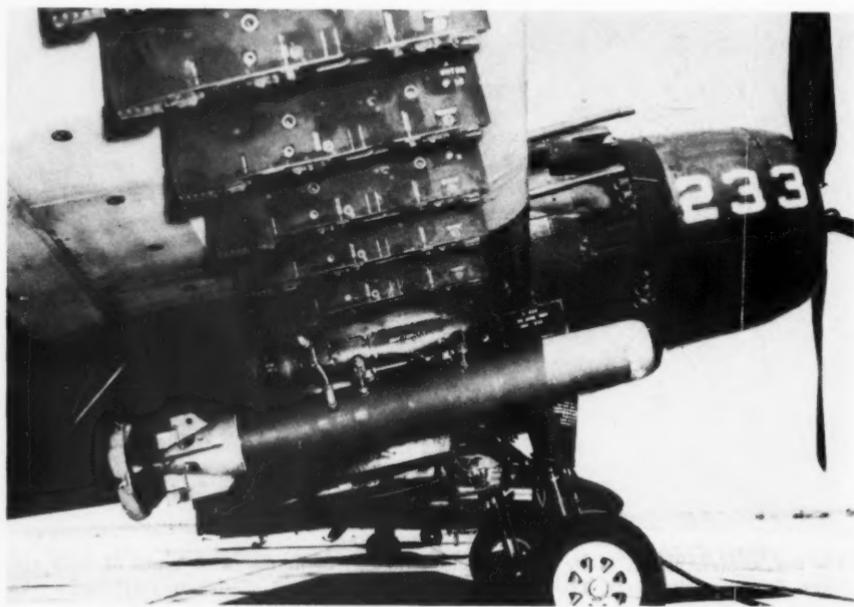
The *Talos*, the Navy's long-range, surface-to-air guided missile shown above, can travel at supersonic speeds and at an altitude higher than any known bomber can reach, and can carry either high-explosive or nuclear warheads. Below, is the *Talos* defense unit, a land-based version of the Navy's *Talos* shipboard missile system.



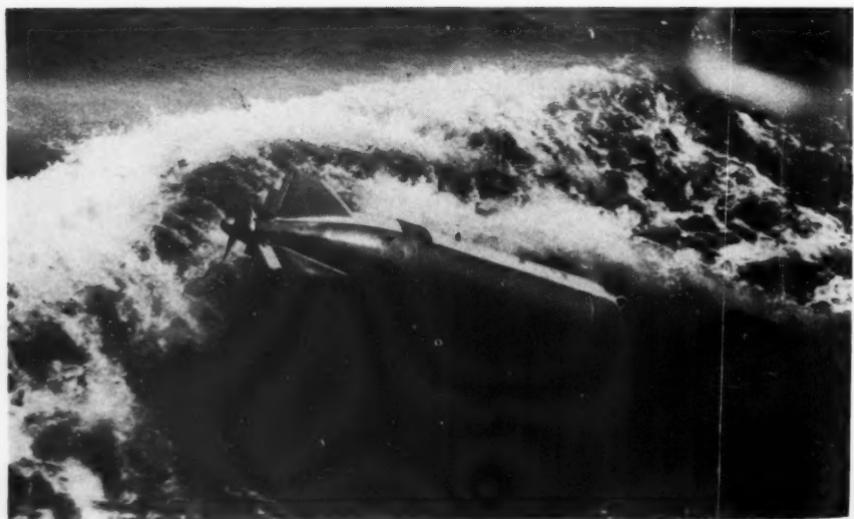


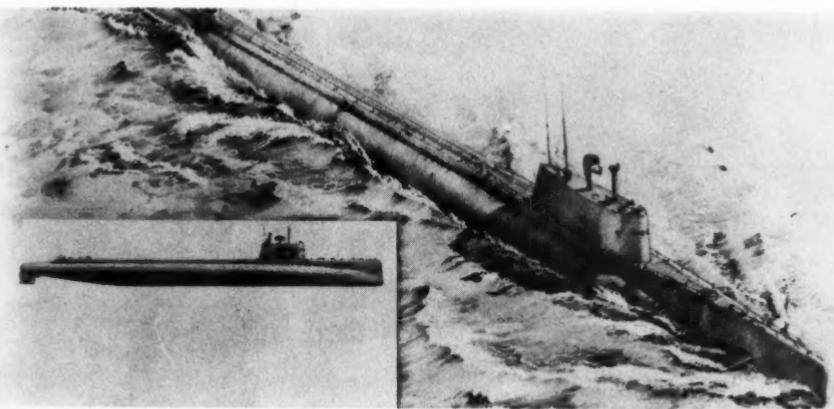
The *Sidewinder*, an air-to-air missile, shown above, is in use with units of both the Sixth and Seventh Fleets. The missile is named after the fast, deadly rattlesnake, the sidewinder. Below, making a test run is the *FJ Fury*, a carrier-based jet fighter with the *Bullpup*, the latest air-to-surface missile slung under its wings.





The *Mark 43* antisubmarine torpedo, above, can be launched from both aircraft and surface ships. Below, the *MK 32* acoustic-homing torpedo drops to seek out its target.

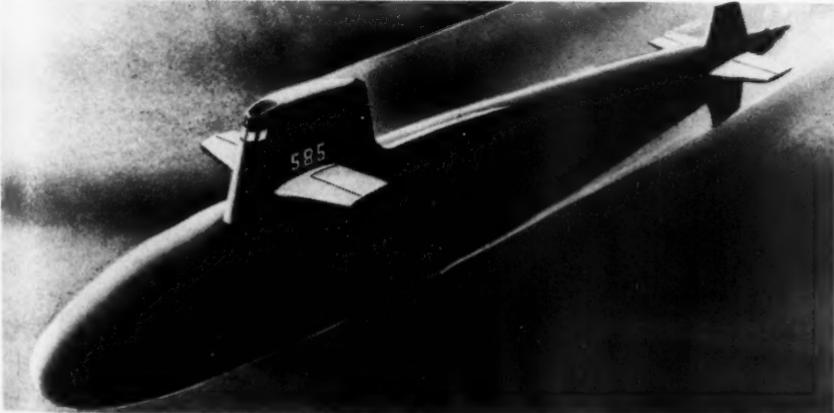




Artist's conception of the *USS Triton*, largest submarine built



The nuclear *Skate*, the world's third atomic submarine, goes to sea



Artist's conception of nuclear submarine *Skipjack* with wings for underwater flying

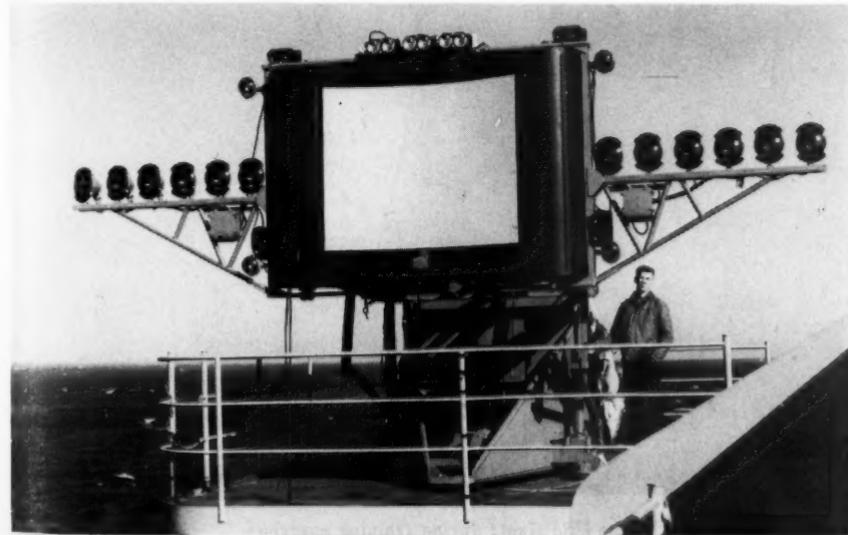


Above, the *USS Canberra*, the Navy's second guided missile cruiser and the only Navy ship named for a city in a foreign country. It has two twin launchers, each served by its own magazine and missile-handling equipment. Shown below, the *USS Saratoga* simultaneously catapults two *F3H Demon* aircraft during carrier qualifications.





Above, is an aerial view of the angled deck *Ranger*, port side, during high-speed turns. Below, is a straight on view of the landing mirror system installed on the *USS Lexington*. The system which has already been credited with reducing landing accidents by more than one-third is being installed on all aircraft carriers.

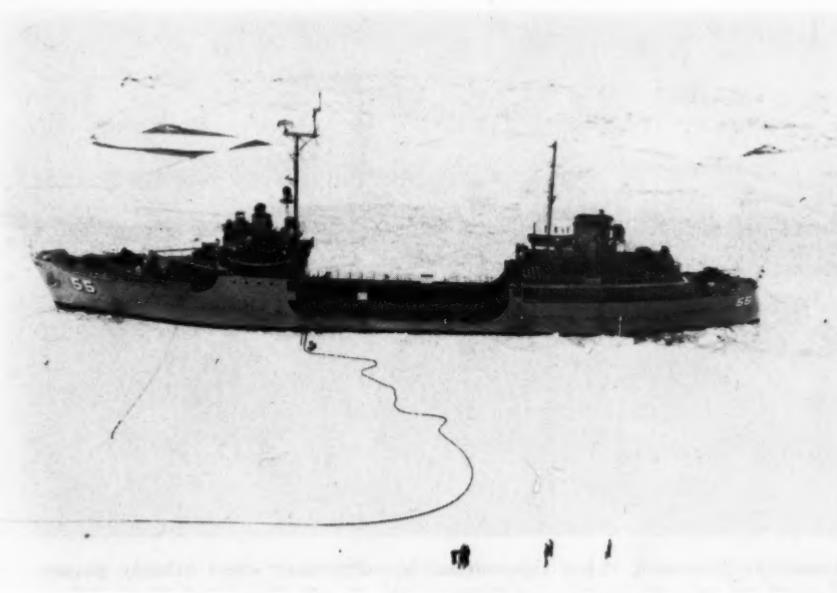




A pilot's eye view of the mirror landing system

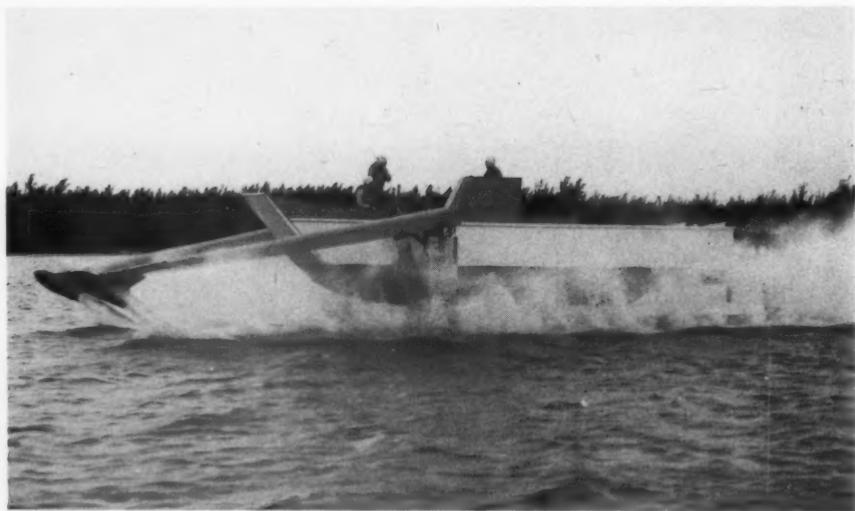


The *USS Gyatt* during training exercises



Above, men of Navy Task Force 43 operating from the *USS Nespelen* during Operation Deep Freeze III at Little America in the Antarctic. Below, the *USS Forest Sherman*.





Above, the *Halobates*, 15-ton experimental hydrofoil boat whose primary purpose is research, is currently undergoing tests by the Navy's Bureau of Ships. Below, an underwater demolition team just up from the bottom after gathering survey findings. The team assisted the Arctic expedition in resupplying Distant Early Warning Line.





Above, *Sea Legs*, a 5-ton experimental hydrofoil craft fitted with two fully submerged foils, one forward and one aft, can reach speeds in excess of 25 miles an hour. Its primary purpose is to test the control and foil system. Below, part of the powerful US Sixth Fleet drops anchor at an isolated island anchorage in the Mediterranean.



ATOMICS

Characteristics and Effects

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This is the second installment of a two-part article (MILITARY REVIEW, August 1958) dealing with basic technical aspects of nuclear employment. In this issue the author discusses factors related to the selection of weapons and delivery means.—Editor.

IN THE employment of nuclear weapons a commander must state clearly and concisely the objective(s) of an atomic attack to provide sufficient guidance to his staff and subordinate commanders for planning. The staff, in turn, must determine the means by which the commander's requirements are met. These may include the selection of weapons, delivery means, burst height, and desired ground zero. In addition, the impact of the resultant effects on both friendly and enemy actions must be calculated carefully.

Selected officers of all services receive special training in this field. However, it is essential that commander and general staff officers have sufficient working knowledge and understanding of the techniques and problems of weapon selection and target analysis to provide basic guidance for sound and effective planning. The nuclear weapons employment officer will have special training in the computation of nu-

clear weapons effects, casualty and damage estimation, and other subjects related to the tactical employment of nuclear weapons. He requires guidance and supervision; his work must be integrated and coordinated with tactical plans.

Delivery Error

The nuclear weapons employment officer has several problems to solve before he can recommend to the commander the type weapon and yield, the best delivery means for the prevailing situation, the height of burst, and desired ground zero. A major consideration in the selection of a suitable weapon system is the delivery error. It influences damage estimation, troop safety, and restrictions on employment.

Each delivery system has an associated probable delivery error, known as "Circular Error Probable" (CEP). If a large number of weapons (as an example, 10,000) were delivered on a target, errors inherent to the delivery system used would cause the weapons to fall in a pattern around the aiming point. Depending on the delivery system employed, this pattern would be either circular or elliptical. For simplicity here all delivery errors will be considered to form a circular pattern.

Referring to Figure 1, one CEP is de-

The magnitude of effective nuclear weapons employment requires a thorough knowledge of weapons effects and characteristics in order that the impact on tactical plans is neither overestimated nor underrated

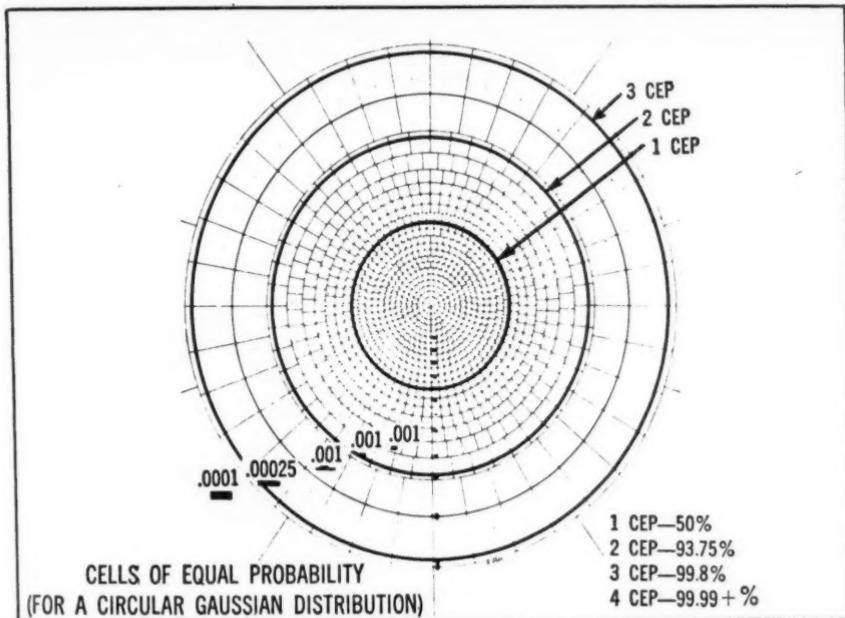


Figure 1.

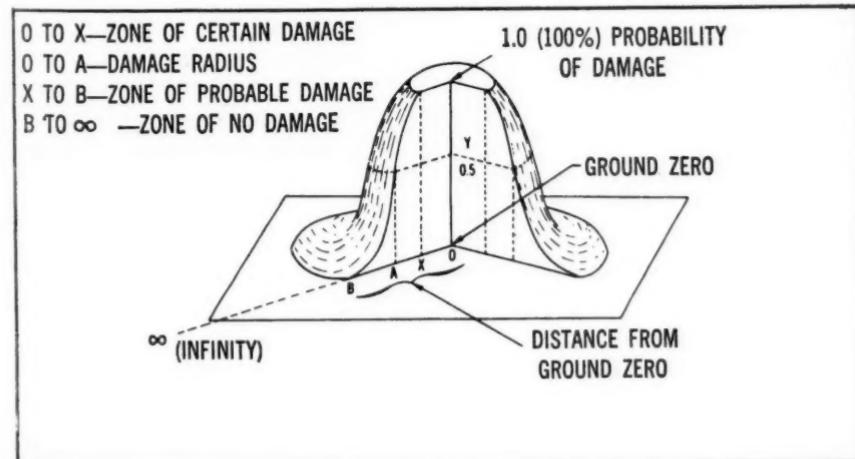


Figure 2. Probability of damage versus distance from ground zero

fined as the radius of a circle which will contain 50 percent of all weapons dropped. If 10,000 drops were made, 5,000 would fall within the one CEP circle, the other 5,000 outside of it. If only one weapon is dropped, it is just as likely that it will fall outside as it is that it will fall inside the circle. The radius of the CEP will

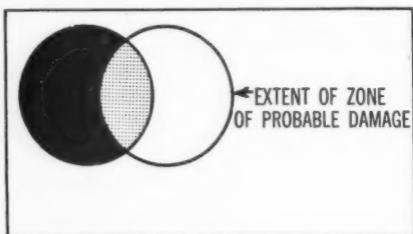


Figure 3. Damage radius and target are equal; delivery error exists

vary, of course, with the accuracy of the delivery system. A less accurate delivery means would result in a larger CEP ra-

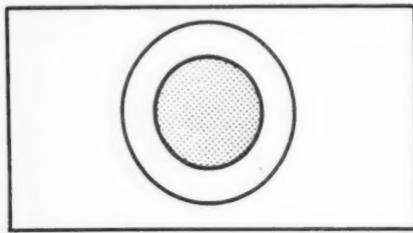


Figure 4. Damage radius exceeds that of target

dius in order to contain its established percentage of the dropped weapons. Therefore, the size of the CEP is important when considering the use of a nuclear weapon against a target.

Target Damage

In the employment of nuclear weapons in support of tactical operations, commanders and staff officers must consider the amount of damage which can be in-

flicted on a target and the influence of this damage on a particular tactical plan. Frequently, the selection of a weapon and delivery means which will cause a desired amount of damage to a given target must be made.

It would be very convenient if a circle could be drawn around ground zero and the statement made that all target elements within the circle are damaged and everything outside the circle is not dam-



Figure 5. Radius of targets exceeds damage radius

aged. Unfortunately, the problem is not that simple.

The severity of the effects and consequently the damage from an atomic explosion decreases with the distance from

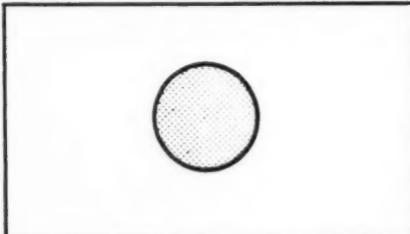


Figure 6. Effect and target of the same radius; no delivery error

ground zero. This may be considered in two ways:

1. Less damage will be done to a particular target element.
2. Not all target elements will be damaged to the same degree.

Consideration is given, however, to the fact that some target elements relatively close to ground zero may escape severe damage while others farther away may be damaged severely.

Close to ground zero is a zone where damage is practically certain. This merges into another zone where damage to some elements of the target is probable. The amount of damage or number of elements damaged decrease as the distance from

from the explosion the effects are weak and the probability that they will cause damage is correspondingly low. As an example, in Figure 2, OA—distance from ground zero—the probability of severe damage is 0.50 or 50 percent. Still farther out from ground zero, the probability is less until a point B is reached where there is virtually no probability of damage.

Why does a nuclear weapon produce

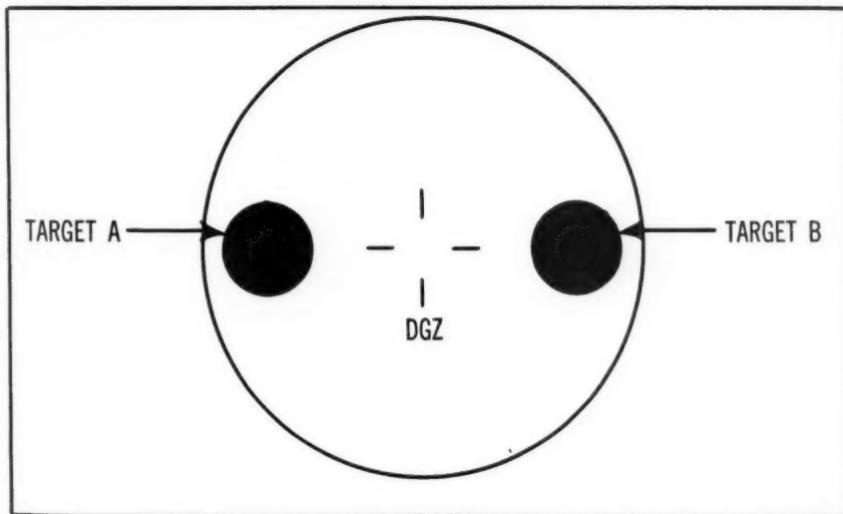


Figure 7.

ground zero increases until the zone of no damage is reached.

It might be helpful, however, to visualize this curve in three dimensions shaped like a bell.

Figure 2 represents the curve of the damage function as it extends radically from ground zero in all directions. For any given distance from ground zero there is an associated probability that a target element at that distance will be damaged. Within a few hundred yards of ground zero the probability is very high, approaching 100 percent. Thousands of yards

this pattern of damage distribution? One reason is because the damage and casualty producing effects of a nuclear explosion (blast, heat, and nuclear radiation) all radiate from essentially a point source. As a consequence, the intensity of the effects decrease with increasing distance from the burst point. In addition, the effects are attenuated by the atmosphere or other media through which the effects travel. As a result, effects are most intense near the burst point and damage practically is certain. Far from the burst point the effects are weak and less damage is done.

Although elements of a target are fairly close to ground zero, other factors may cause some to be damaged and others to escape damage. If the target elements are oriented at random throughout the area, some will be shielded by minor irregularities of the terrain. Personnel in the shade of trees or buildings may not be burned even though they are closer to the burst than unshielded personnel who are burned.

Blast damage to vehicles or buildings will vary depending on their orientation with respect to the burst point. A vehicle positioned side-on to the blast wave is more easily damaged than one with the back toward the burst. The response of

circle at that radial distance from the burst will suffer damage. Closer to ground zero the probability of damage is higher than 50 percent, yet some elements of the target will still escape damage. Farther from ground zero, the probability of damage is lower than 50 percent; however, some damage still occurs.

Problems in Estimating Damage

As can be seen, the systems for delivery of nuclear weapons are subject to certain delivery errors which are fairly large in some cases. When one considers that there is a 50-50 chance the weapon will be outside the one CEP circle and that it may be as far as two or three CEP's away from

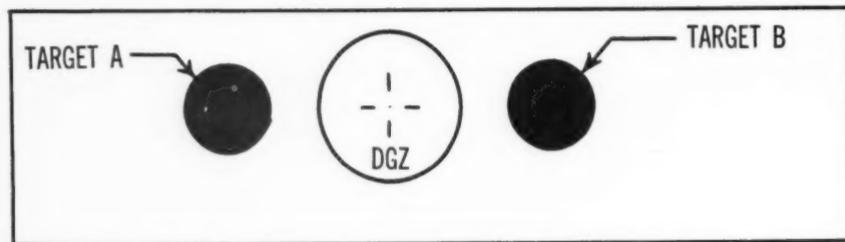


Figure 8.

one target element may differ from the response of another although they are apparently identical. The resistance of various individuals is different. For example, a dark skinned individual will burn more easily than a man with fair skin. Generally, a tired soldier can take less nuclear radiation than a soldier who is rested.

The result of all these factors is a distribution of damage as shown on Figure 2. This is considered realistic for tactical targets.

The term damage radii (R_D) is used to represent the intensity of a weapon's effect. This is the distance from the burst at which there is a 50 percent probability of damage to a single target element. Expressed differently, 50 percent of all target elements on the circumference of a

the desired ground zero, this introduces a major problem in damage estimation.

The term "desired ground zero" (DGZ) is used to designate the point on the earth's surface at which, below which, or above which detonation is desired (depending on the decision to employ surface, air, or subsurface bursts). The desired ground zero is still the aiming point.

Figures 3 through 6 graphically portray some of the problems connected with the estimation of damage and casualties. In each figure the white disk represents R_D , the effects circle of a nuclear weapon. The portrayal would be more realistic if the disk were gradually shaded from the center to practically colorless at the edge.

The black disk represents a target. The dotted area represents the area of the tar-

get covered by the effects circle of the nuclear weapon.

In Figure 3 the radius of the target (R_T) is the same size as the R_D . However, an error in delivery has been made. This error in delivery is such that the target is only partially in the zone of probable damage. Casualties are presumed to occur only in the dotted area of the overlap and there they will not be uniformly distributed because of the variation in effect intensity from ground zero out to the limit of the significant effects.

Persons with a mathematical background will appreciate the complexity of the problem of estimating casualties in this typical situation. The overlap area

weapon is small. In this case it is not difficult to hit the target even if the delivery error is great. There is a very high probability of doing some damage to the target; however, this damage is limited by the effects this small weapon can produce.

In some cases it can be considered that there is no delivery error. A weapon may be installed at the desired ground zero like any other demolition. This does not mean that it always will be detonated at the center of the target since a moving target may not cooperate; however, the exact location of ground zero is known.

There are two additional cases in which a weapon may be considered as preposi-

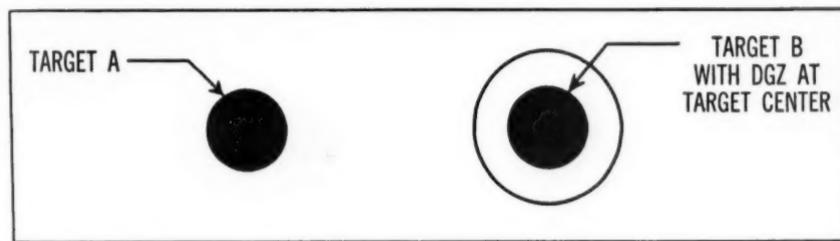


Figure 9.

of the two disks must be integrated by calculus, yet in the black disk there is an uncertainty or variability as to how the target will react, while in the white disk there is a continuous change in the intensity of the weapon effect. With this would be considered the probability of getting various degrees of overlap due to the errors of delivery.

If the target is small and the yield is large as in Figure 4, the weapons effects have a good chance of covering the entire target. At the same time, much of the weapon's effect is wasted. Even though the target is fully covered by the weapon effects, the distribution of damage or number of casualties still will vary with the distance from ground zero.

In Figure 5 the target is large and the

targeted. The first is for a poststrike analysis when a nuclear explosion has taken place and ground zero has been determined by reconnaissance. The second case is analyzing friendly dispositions in the event the enemy should use nuclear weapons. The weapons employment officer solves these problems in damage estimation using charts and templates to determine expected damage, and to select an appropriate weapon for the target.

Selection of DGZ

Another important problem in the tactical use of nuclear weapons is the selection of a desired ground zero. For simple targets the center of an area target usually is the best solution, or in the case of a point target, the point itself. For com-

plex targets the problem is a little more difficult. Considerations of safety for friendly troops also complicate the problem.

In the analysis of a target complex, the destruction of one target may be militarily more important than another. Consequently, the selection of a DGZ should favor the more important target.

In Figure 7 are two similar point targets of equal military worth. If the distance is not excessive, the DGZ should be located halfway between them.

The white circle represents the applicable effects circle R_D of an assumed weapon

no advantage to selecting a DGZ midway between either target. If the effect will not reach either target when the DGZ is at the midpoint, the DGZ should be centered over either target.

Frequently, the targets are not identical in nature and each requires a different magnitude of effect to satisfy the commander's requirements. Assume that point target A is a group of enemy personnel in the open while point target B is a group in foxholes. Obviously, the DGZ must be closer to group B than to group A in order to achieve the desired number of casualties. In this case a method of

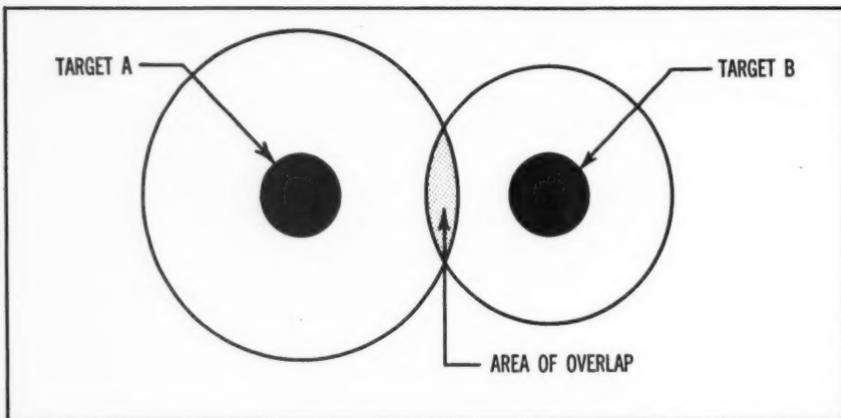


Figure 10.

against these targets. Should the destruction of one be more important to the commander, that target may be favored by shifting the DGZ toward it. This increases the intensity of effect and the probability of damage to the more important target.

If the distance between targets is too great (small radius of damage), then the midpoint between these two targets is not a good DGZ. Figure 8 illustrates this.

Under these conditions the DGZ should be moved to one of the target elements as shown in Figure 9.

Note in Figures 8 and 9 that there is

determining the DGZ is to draw a circle, around each point target, which represents the significant radius of casualties for a trial weapon in working the problems out on paper. It will be necessary to find a weapon which will achieve an area of overlap. Figure 10 is an example of this. The DGZ should be placed in the area of overlap of the two circles (denoted by a dotted area on Figure 10).

For each target the clear circle incloses the area within which the weapon should fall if damage to the target is to be achieved. The R_D represented by the white

circles in Figure 10 is not necessarily the minimum R_D which will ensure the desired amount of damage to the target. Because of the offset DGZ and to compensate for errors in delivery, the R_D must be large enough to provide the probability of damage desired.

To determine how much damage will result because of the location of the DGZ, it will be necessary to recompute the damage

ilar in composition and military worth. If they can be covered by the effect of one weapon, the logical DGZ is in the geometric center of the targets.

If the distances from the geometric center to the three targets are too great for the weapon available (small radius of damage), then the DGZ should be either between two of the targets or centered on one of the targets. When this occurs the

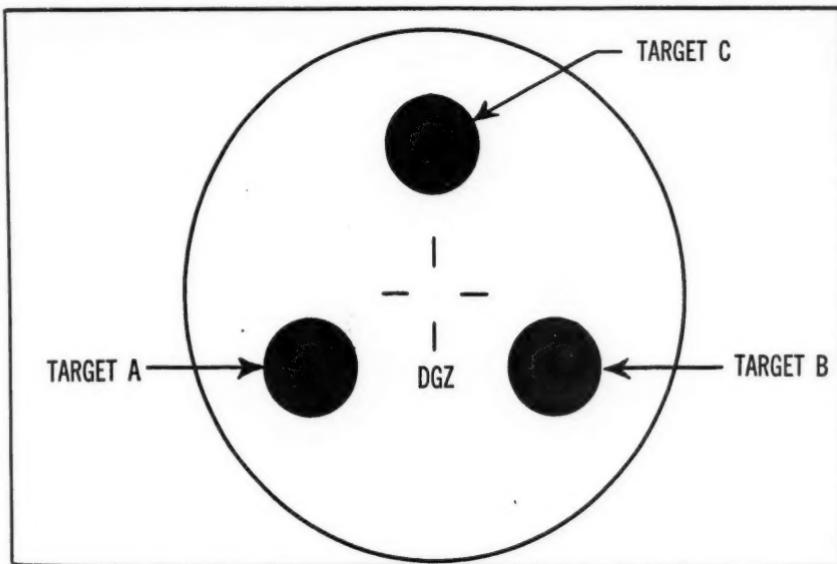


Figure 11.

to determine if the DGZ selected actually will accomplish the desired results. If the results computed are less than those desired, it will be necessary to increase the size of the weapon to be used or move the DGZ.

Three-Point Targets

Thus far consideration has been centered on a target complex containing two-point targets. What are the problems in the selection of a DGZ when a target complex contains three or more elements? In Figure 11 the three-point targets are sim-

problem becomes that of a two-target complex as previously described.

In many instances the targets are dissimilar or have different military worths. When this is the case the appropriate damage or casualty radii should be used for the selected weapon against each target. Figure 12 illustrates this condition.

In Figure 12 each target is surrounded by a radius of damage circle within which the selected weapon should be dropped if some damage to the target is to be attained. Somewhere in the area of overlap

of the three circles (dotted area) is the best DGZ for this target complex. Exactly where the DGZ is selected by the weapons employment officer is a matter of trial and error. For each trial DGZ it will be necessary to recompute the damage which will result and compare it with the desired results.

Point targets have been used in this discussion of the selection of a DGZ; how-

and yet will produce the required damage to the target.

Troop Safety

The use of nuclear weapons in support of tactical operations also requires that close attention be given to the safety of friendly troops. When the tremendous destructive force of these weapons is considered, and the fact that it is not usually possible to place the point of detonation

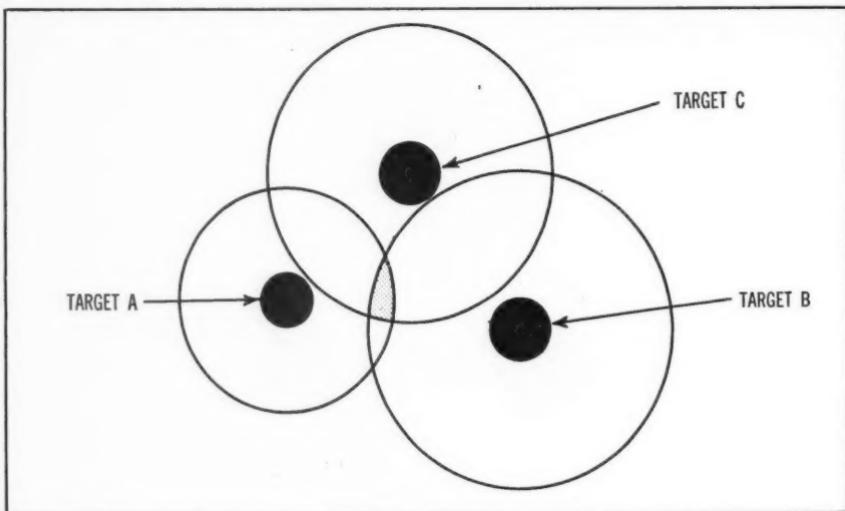


Figure 12.

ever, the same procedure applies to area targets.

Also, in this presentation on the selection of a DGZ, the illustrations have concentrated on situations where damage is desired on all targets. Situations will arise where damage is desired on some targets but no damage is desired on nearby installations. Examples may be the destruction of the enemy without damaging a vital bridge or endangering the safety of friendly troops. These problems are solved by selecting an offset DGZ which is the required distance from the target to preclude damage to the installation desired

at the exact spot desired, it is apparent that troop safety is a matter requiring most careful consideration by the commander and his staff.

It is to be expected that the criteria for troop safety will be established in policy announced at a very high level of command, possibly theater level. This statement of troop safety policy may include the maximum intensity of any weapon effect to which friendly troops may be subjected and what precautions must be taken to ensure that this criteria is not exceeded. At the level of command where the decision is made to employ the weapon, the

commander will announce any restrictions necessary to meet the troop safety criteria which he or higher headquarters may prescribe.

The distance from the burst point to the nearest friendly troops is an important factor in determining if there is any risk to such forces. The nature of dispositions also is a consideration.

In Figure 13 friendly troops are in a straight line and the DGZ is as indicated. Unless the weapon is prepositioned, the

lar disposition (Figure 15), the risk to friendly troops is greater than if they are in a straight line since the area in which the burst point can move without affecting the friendly troops is more restricted.

The risk is even higher in the case of semicircular (Figure 16) or circular dispositions as shown in Figure 17.

Others Factors

In the selection of weapons and delivery means certain tactical aspects are of

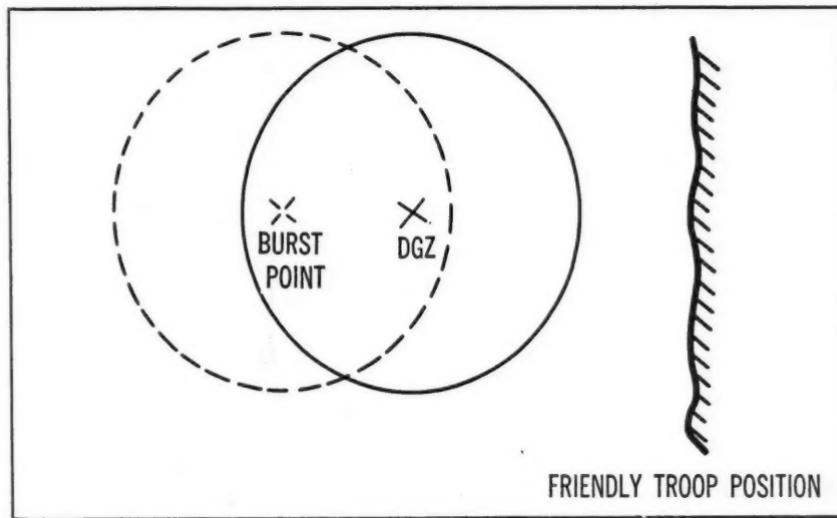


Figure 13.

delivery error may cause the detonation to occur at some other point (shown as burst point and the consequent radius of significant casualties as shown by the dotted line will result).

If the error is such that the burst point is no closer to friendly lines than the DGZ, then the risk actually is decreased. Only if the burst point is closer than the DGZ (as shown in Figure 14) will the risk to friendly troops be greater (as indicated by the dotted line).

If the troops are in a quarter circu-

vital importance. Tactical considerations will establish whether nuclear weapons can be employed profitably in a given situation. In addition, the commander and staff, after studying the tactical situation, will determine what the goal or objective of the atomic attack should be. This, in effect, designates the target and prescribes what degree of damage must be accomplished to ensure success of the operation.

The tactical situation also may dictate certain limitations. For instance, the commander may desire no damage to certain

installations which he plans to use. Using the objectives and limitations set forth by the commander as a guide, it is possible to determine which weapon effects to employ against the target and what minimum damage radius is essential to create the desired degree of destruction or fractional damage.

Weapon availability is one of the technical factors to be considered. Allocations of nuclear weapons will vary considerably

and deliver it may preclude the use of some weapons when an attack must be carried out without delay. Through proper planning, weapons requirements can be anticipated and the time required to prepare for the attack reduced.

Delivery system availability is another technical factor to consider. Only a number of agencies or units have atomic delivery capabilities and their capabilities for delivery of specific weapons differ.

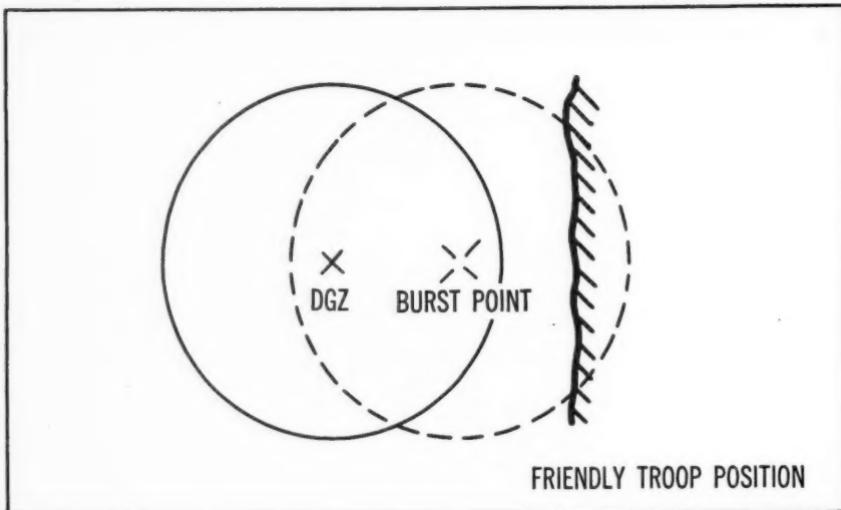


Figure 14.

depending on the importance of the mission to be accomplished and the availability of types and numbers of weapons. As in allocations of other means, the principles of mass and economy of force will apply. In one area, nuclear weapons may be employed in mass in order to achieve decisive results. To permit this, forces in another area may be allotted no nuclear weapons or only the minimum essential to the accomplishment of their mission.

The time factor is an important aspect of availability. Even though allocated for use, the time required to ready the weapon

The weapon type and size and the delivery means contemplated must be compatible.

Certain terrain and weather conditions may preclude the use of a delivery means. Weather conditions may limit visibility or lower delivery accuracy. Air delivery, depending on visual sighting, may be too unreliable for use at night and under other conditions of poor visibility unless radar ground control is available. Terrain characteristics may restrict the choice of approach paths to be used by delivery means and limit target identification (particularly in the case of air delivery).

The range of the delivery vehicle must be considered. If it is necessary to displace a battery, for example, to put it within range, timeliness must be considered.

Timeliness may be affected by such factors as time to move weapons and/or de-

Tactical surprise may be more difficult to achieve with some delivery systems. If the enemy has time to take cover before

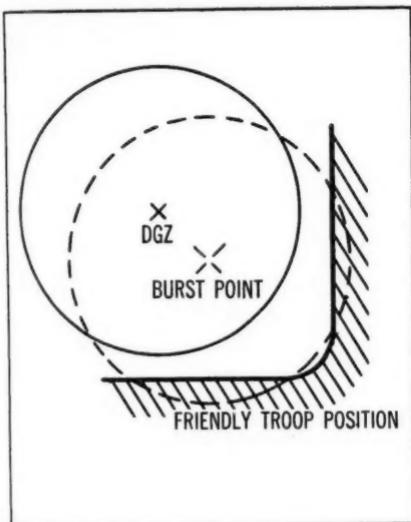


Figure 15.

livery vehicle into position; time for making survey, preparing emplacement, and computing firing data; time of flight in case of aircraft; and time to effect required coordination.

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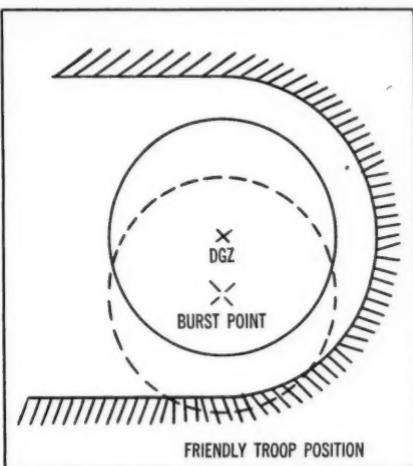


Figure 16.

the burst occurs, much of the effectiveness of the weapon may be lost.

The commander coordinates the delivery of the nuclear weapon and his scheme of maneuver. He should consider fire and ma-

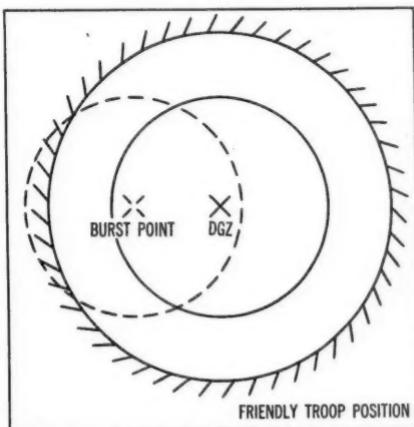


Figure 17.

neuver simultaneously. This coordination is affected by the time required to effect delivery, the accuracy with which the time of burst must be predicted, the numbers and types of agencies involved in the preparation and delivery of the weapon, and the characteristics of the delivery means themselves.

The delivery accuracy required depends on the nature of the target, the damage and assurance desired, the proximity of friendly troops, and troop safety criteria.

The different delivery means are susceptible, in varying degrees, to enemy countermeasures. Aircraft may be lost to enemy air interception or antiaircraft fire. Counterbattery fire may be effective against the artillery gun or rocket units.

Economy is an additional technical factor to be considered in the selection of weapons and delivery means. While economy is not the most important factor, it often will be a deciding factor. Judicious use of allocated weapons may enable a commander to maintain a reserve of atomic firepower as well as a reserve of troops. In general, the smallest weapon which will

accomplish the task should be selected, other factors being equal.

Conclusion

Some of the tactical and technical considerations which enter into the selection of weapons and delivery means have been discussed above. It should be emphasized that many problems concerning timely availability of weapons and/or delivery means may be more easily solved if requirements are anticipated. Advance planning, warning order, and timely preparation for anticipated targets will reduce to a minimum the time between the decision to fire and the actual detonation of the weapon.

Effective use of tactical nuclear weapons requires understanding and careful consideration of a number of involved but important interacting factors. Seldom, if ever, will the planning be simple and easy. It is, therefore, extremely important for the military man to prepare himself now to solve the problems quickly and accurately when the need arises at some future date.

Our Army must have the means of applying at any specific point, and at any precise moment, the exact amount of force required for the accomplishment of the specific task that may confront it at any particular time. Our Army must always have in its arsenal an adequate supply of atomic weapons in a variety of sizes which can be used with discrimination against close-in as well as distant pinpoint targets, with extreme accuracy day or night, despite rain, snow, fog, or any other weather condition. They are necessary in order that we may be able to support our troops properly in any battle situation without unnecessary wholesale destruction.

Secretary of the Army Wilber M. Brucker

SUPPORT IS A FIELD ARTILLERY MISSION

Major Richard C. Carnes, *Artillery*
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THE dawn of the Pentomic era has been marked by the unique phenomenon of thousands of artillery officers talking to themselves. The Pentomic concept, insofar as artillery organization appeared, was a semantic bomb which upset their daily working words, and confounded conversation with the supported arms. The old language was unsure in the frame of new deployments, and individual interpretation ran rampant through the hallowed techniques of the orderly triangular division. Many new thoughts were, and may still be, imprisoned within their conscientious originators, for lack of mutual understanding of basic terms.

The basic terms of field artillery are its tactical missions, as defined in a chart entitled "Field Artillery Tactical Missions."¹ The consensus is that these missions have not changed, and that the new concept of "support" is nothing more than an extension of freedom of action, or decentralized control, down to battalions. Previously, division, corps, and army artillery commanders habitually operated with this type of guidance. "Division Artillery: *Support the attack.*" That was the order, and there was no specific doctrine connected with it, because this doctrine was simply the whole science of artillery.

Now, battalions will receive this mission type order, and present doctrinal thinking is that when a battalion is ordered to

"Support," it does not have a tactical mission. This means in theory that the supporting artillery commander has the "flexibility to employ the artillery available to him in the manner best suited in his judgment to assist in accomplishing the force mission, within the guidance provided by the force commander."² Still other doctrinal thinking is beginning to spell out very specific requirements for the battalion in the "Support" role, for example, "provides a minimum of 105-mm howitzer battery to reinforce the fires of each committed battle group."

Obviously, a battalion operating within the complex of the division fire support coordination system, as a contributing member, must have many prearranged techniques which will contradict time and again the definition of "Support" as given above. Only when the battalion supports a force which is clearly a separate force, in terms of artillery ranges, will it operate in the full sense of "Support" as a mission type order. In this case, of course, the battalion may well be attached to the separate command.

It seems clear that "Support" is a field artillery tactical mission, and must be so identified in the same terms as the other artillery missions. If for no other reason, this is necessary for the education and training of junior artillery officers who

¹ Field Manual 6-20, *Artillery Tactics and Technique*, Figure 6.

² Paragraph 3, Part V, Appendix I to supplemental material for USA CGSC Lesson 2045/8, "Field Artillery-Characteristics, Organization, and Employment."

Reorganization of the divisions and change in organizational posture of supporting artillery coupled with the changing tactical concepts have created a need for a clearer definition of the term "Artillery Support"

normally do not have the experience to appreciate the nuances of word gymnastics involved in mission type missions versus tactical missions. And for that matter, does anyone?

This article, then, is a proposal for change of the chart, "Field Artillery Tactical Missions." It is also by premeditated coincidence a plea for the tactical survival of divisional battalions. The first order of business is to reaffirm the old missions which have received their share of buffeting in the doctrinal storm. These terms are still perfectly good, and need only the modernization of a few Pentomic accoutrements. Expanded and modified definitions for "Direct Support," "General Support," and "Reinforcing" are recommended as shown on the chart on page 44. This chart also shows two new missions with the name "Support," but before these are introduced, some general discussion is appropriate.

Fundamentals

When the artillery commander with any force recommends an artillery organization of combat, he strives to obtain two conditions fundamental to effective artillery employment. These are:

1. Proportionate allocation of all available artillery to fit the commander's scheme of maneuver.

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2. Optimum use of artillery headquarters, staffs, and liaison and forward observer teams, so that fire support, in planning and execution, is conducted for the maximum benefit of the force.

The advent of new type divisions apparently has clouded the understanding of artillery doctrine, which must always be based on these fundamentals. So long as the infantryman closes with the enemy, artillery will support him in his timeless role. The form, or vehicle, for this fire support may change, but the principles of its employment are also timeless.

Consider, then, how environmental or matériel changes affect artillery employment. A longer range gun, rocket, or missile simply broadens the capability or zone of action of artillery units so equipped. Conversely, close support weapons often are inadequate to provide fire throughout even the width of the zone of the supported unit. Thus pre-Pentomic concepts of artillery units operating within the zone of action of the supported unit become uneconomical or awkward.

Weapons capabilities certainly have been considered in the assignment of artillery missions in the past, but not in the degree demanded by the increased atomic battlefield. For example, a light battalion with a mission of General Support in a 20,000-yard division front needs far more definitive instructions before it can so much as reconnoiter for positions. Another light battalion may be supporting a battle group, but can cover only part of the battle group sector. With no reinforcing battalion available, this battalion may have to detach batteries to the remote area. What is the mission of these batteries, and from what source do they receive it?

These are only two of dozens of situations which could be cited to illustrate the present dilemma. The solution lies in granting *Support* full legitimacy as an official, firmly defined, field artillery mission. The definition recommended in the

Proposed Missions Chart is completely firm with respect to responsibilities, but does not fix in any way the commanders' (artillery and force) choice of deployment. This is intended, and contrary to some present doctrine. *Sector Support* is defined essentially the same as the "Support" mission, except that this term warns at once that the support responsibility in the zone of action of the supported unit is shared with another artillery battalion.

This doctrine would appear to be duplicating responsibilities, but actually will be forced in every case by terrain, or the luckless situation where artillery is in short supply. A given situation may have too broad a front, too many avenues of approach, or too few batteries. No matter how the problem develops, a given amount of artillery can produce only so many primary and contingent zones of fire, and these will determine the cut of the pie. There can be no duplication in fire planning or execution if the owners remain hired as the operators. This premise lights up what is perhaps the most important requirement for these new missions.

Although the Pentomic organization appears to have dismissed the battalion headquarters from fire support channels, this could not have been the intent of the planners. Paragraph 39e, Training Text 6-21-2, *Division Artillery Infantry Division*, United States Continental Army Command, February 1957, states in part: "When a field artillery battalion has been given the responsibility of coordination of the artillery fires of a portion of the division sector (including that of the regimental sector), the artillery portion of the regimental fire support plan will be forwarded to the division fire support coordinator through that battalion." [Italics added.]

Clarification Required

The new mission definitions must clarify, in fact, assign the management responsibilities implied but not defined above. This

requirement stems from another fundamental principle for which the artillery has no copyright because it belongs to every well-run organization:

Centralized control of artillery and other fire support means is achieved by effectively decentralized management.

On the chart, three new columns have been added to those long established in the doctrinal law of artillery. The first of these, "Coordinates artillery fires, forwards requests for additional artillery for," settles the management question, and identifies without doubt the supported unit's next higher artillery echelon. This function has been the recognized prerogative of the direct support battalion but now, with changed and still changing organizations, there are several ways in which the supported force might receive this service. Adoption of this definition will halt any such confusion.

The two other new columns specify who furnishes the fire support coordinator, and the conditions which authorize "sub-missions." The FSC column assures that all maneuver elements will have fire support coordinators, and also provides the artillery technicians to complement the fire support coordination centers. These arrangements are related directly to the new sub-mission concept. Consider the battalion which supports two organizations, one with organic (direct support) artillery, and one without. It may send to the force without artillery only a liaison officer (fire support coordinator), liaison team, and communications personnel, according to the situation and the desires of the supported commander. Or, the battalion may assign a battery a sub-mission of "Direct Support" of this force, thus settling the matter of fire support coordination and all related problems.

The "Support" mission permits the artillery battalion commander to tailor his artillery support to whatever is needed by the one or more units concerned. After flex-

PROPOSED FIELD ARTILLERY TACTICAL MISSIONS						
An Artillery Unit With a Mission of:	Answers Calls For Fire From:	Coordinates Artillery Fires, Forwards Requests For Additional Artillery for	Units Fire Support Coordinator to:	May Assign Separate Artillery Mission to Subordinate Batteries.	Establishes Communication:	Most Furnish Forward Observers:
Supported Unit Own Observers. Next Higher Headquarters.	Supported Unit	Supported Unit	No	With Supported Unit	Zone of Action Supported Unit. As Directed.	Necessary to Perform Direct Support Mission. Ordered by Higher Headquarters.
Next Higher Headquarters. Own Observers.	—	—	No	No	Zone of Action Supported Command	Ordered by Next Higher Headquarters
Reinforcing (Battalion or Battery)	Reinforced Artillery Own Observers	—	No	With Reinforced Artillery	Zone of Fire Reinforced Artillery or as Directed	As Requested by Reinforced Artillery
Support (Battalion or Group)	Supported Units. Own Observers. Next Higher Headquarters.	Supported Units	Yes, as Requested By Supported Units	With Supported Units	Zone of Action Supported Unit(s)	As Requested by Supported Unit with no Organic or Direct Support Artillery
Sector Support (Battalion or Group)	Supported Unit Own Observers. Next Higher Headquarters	Supported Unit	Yes, as Requested By Supported Unit	With Supported Unit	As Defined on Fire Capabilities Overlay	As Requested by Supported Unit with no Organic or Direct Support Artillery

NOTE: THIS CHART EXPANDS CURRENT FIELD ARTILLERY TACTICAL MISSIONS AS DEFINED IN FIGURE 6, FIELD MANUAL 6-20, "ARTILLERY TACTICS AND TECHNIQUE." HEAVILY OUTLINED BLOCKS ABOVE ARE ENTIRELY NEW IN CONCEPT. UNDERSCORED WORDS IN OTHER BLOCKS IDENTIFY PROPOSED MODIFICATIONS OF PRESENT DOCTRINE.

*NOTIFY NEXT HIGHER HEADQUARTERS OF NEW POSITION OF
ALL ELEMENTS. TIMES OF DISPLACEMENT, AND CLOSURE

bility the key characteristic of "Support" is that it permits easy organization of intermediate artillery headquarters throughout the division zone, no matter how the division is deployed, and without respect to attachments or detachments. Corps artillery battalions which may be in "Support" of the division should be given a sub-mission to "Reinforce" the divisional "Support" battalion, unless their fire capability is broader than this particular support sector. In this case their mission may truly be "General Support," or "General Support, reinforce ----- Arty."

Corps light or medium battalions which are attached to the division also may be given a "Support" mission within the division. It is still desirable to equip each maneuver force with its own supporting artillery in the maximum quantity that battlefield space and artillery availability will permit. Tables of organization of non-divisional artillery units do not readily adapt them for all requirements of the support function, but it may be assumed that any battle group will gladly accept a whole battalion, be it short observers and complete fire direction centers in every battery, rather than one battery.

Fire Direction

The definition of "Support" as herein proposed also contradicts old doctrine on *technical* and *tactical* fire direction. Academically, technical fire direction is the mechanics of pointing the guns, to include the work of all the fire direction specialists. The bulk of these have been transplanted from the Pentomic battalion to the battery, along with a battalion size complement of survey and communications personnel. Thus this battery has a fine capability for independent operations, but it does not contain all the elements for ultimate technique in artillery fire support.

This technique is fire planning, detailed, continuous, and fully integrated with intelligence, and, operating a highly respon-

sive system for on-call missions; all of which places the right volume of fire on the right targets, at the right time, consistently throughout the action. The backbone of this technique is the smoothly functioning pyramidal structure of the United States division artillery, perfected in World War II and never excelled. This is no reactionary plea to sit tight on what we had, but to emphasize again the technical value of the battalion as a management element. Tactical fire direction is definitely technical in nature. It is highly specialized executive skill, born largely of experience, and not likely to be mechanized into a computer. And, it is a team technique which must include all echelons of the artillery with the force.

Close examination of the "Support" definitions proposed will reveal one flaw—the battalion commander, acting as an intermediate level artillery fire support coordinator with no comparable force commander, may get into the following situation: either or both of his supported commanders, when he is supporting two units, may demand more than their fair share of the immediately available fires, according to the artilleryman's advice. If the requests are pressing, he can only refer them back to the commanders for their mutual decision, since he has been placed in the position of making a command decision which is not his duty and for which he has no authority. When communications are in and time permits, such conflicting fire requests would be forwarded through division artillery for resolution at the division level while the bulk of the fires, preplanned and routine, carry on.

Support Mission

Acceptance of "Support" as a regular mission, with its features uniformly understood throughout the supported arms, should eliminate much if not all current confusion. Operations orders details such as "furnish liaison, communications, and observers to -----" will be eliminated.

The questionable practice of the division staff writing detailed organization of the artillery to include light batteries, to be certain that "Battery 'Z' reinforces the 26th Battle Group" (*always*) should also be discontinued. These details are important, but their planning, ordering, and supervision rest squarely with the staff of the commander who is responsible for artillery, and nowhere else.

"Sector Support" presupposes that the force artillery is spread thin. The obvious objection to this concept is that the supported unit must contend with two fire request channels. The clear justification is that two direct quick fire channels are far better than one long roundabout one. A battalion could be assigned a "Support," and a "Sector Support" mission concurrently, or a "Sector Support" mission alone. It is unlikely that the terrain and/or artillery situation would ever dictate the assignment of two Sector Support missions to one battalion. The Proposed Missions Chart indicates that the Sector Support battalion coordinates artillery fires for the supported unit—this means, within the sector of its capability, or simply, within its assigned sector.

Conclusion

In the rush to pentomization, the role of the intermediate, coordinating headquarters cannot be scrapped arbitrarily. This truth is nowhere more clearly demonstrated than in the division fire support center which, according to present trends, will soon disappear under a snowstorm of uncoordinated fire plans and requests. This is because we are moving toward total violation of an honored and proved rule: "Fire support coordination is accomplished at the lowest level that has the means." If the new, lean divisions are to receive augmenting artillery in combat, as they will, then artillery missions must permit the ready use of augmenting field commanders and staffs, as well as their guns. Any other solution guarantees that the bulk of artillery fire planning will be overcentralized, and execution of fires will be directed largely from the top down, rather than filtering up.

These five missions, and their definitions, should settle the rules of field artillery employment until the pushbutton really does take over. With all faith in the man with the bayonet, the field artillery plans to be around for a long, long time.

The development of small-yield weapons represents an advance which—although often overlooked—is extremely important militarily. It is important because, for example, it enables us to put into the hands of a frontline squad a degree of firepower equivalent to the capability of a World War II medium artillery unit. Furthermore, these smaller weapons are being developed with several degrees of destructive power.

Our advances in firepower have not been confined solely to atomic weapons. Marked progress has been made in the development or improvement of weapons for our nonatomic arsenal. Through such means the Army possesses and is increasing a wide range of destructive capability, giving it a flexibility which is particularly valuable for the successful conduct of modern battle. Thus with the varied weapons now available or whose availability is anticipated in the near future, the commander can select those which are best suited to the requirement of the moment.

General Lyman L. Lemnitzer

Career Management For the Reserve Component Officer

Lieutenant Colonel Mario J. Zecca, Armor
Student, U. S. Army War College

Our emphasis now swings from recruiting to training—from numbers to quality.

—General Maxwell D. Taylor
Chief of Staff, US Army

AN ANALYSIS of the ingredients of victory in a war of the atomic era more than ever indicates that the keys to such victory probably will be:

1. Carefully considered and developed war plans.
2. Development and availability of quality implements of modern war.
3. Adequate and timely development of the applicable doctrine to best utilize these tools.
4. Balanced active and reserve forces of sufficient size, flexibility, and training to cope with these missions—which for the Army are:
 - a. Initial redeployment in the early days of war.
 - b. Serving as a nucleus for an expanded wartime force.
5. Adequately trained and developed leaders (officers), both in the active forces and in our Reserve components, to implement war plans.

This article will discuss a portion of the last of these ingredients, specifically "the development and training of leaders (officers) in our [Army] Reserve components."

If the US Army is to develop and maintain a ground force capable of meeting probable wartime demands, the selection, training, and development of its leaders (officers) is a primary peacetime concern.

Department of the Army Pamphlet 600-3 (1956), *Career Planning for Army Officers*, outlines the career plans for Army officers (active) and Reserve officers (*on extended active duty*) by providing for the maximum development of their interests, inherent abilities, and aptitudes as well as for the best utilization of their acquired skills and accumulated knowledge.

Properly, here should follow the Army plan for the development of the career patterns for Reserve officers (*not on extended active duty*). Since current Army regulations or directives furnish such guidance, this article will outline proposed procedures.

Value of Career Management

The major engagements on the atomic battlefield of tomorrow may be won or lost by the commanders and staffs we develop and train in the Army Reserve Program of today.

Since the outcome of future engagements may depend upon the professional knowledge and skill of officers of the Army Reserve, a Career Management Program to develop and improve such knowledge is vital

Career Management is "double-barreled." It has a utilitarian value to the service and it has equal value in potential self-improvement to the individual Reserve officer.

Career Management has proved its value insofar as it has been applied to the Active Army and to Reserve officers on extended active duty. True it has not been a cure-all, and certain problems of application still remain to be fully resolved. It has, however, proved an effective part of the over-all organization designed to improve the individual officer's value to the service and to increase his flexibility of assignment. This, in turn, has resulted in an over-all improved efficiency of the service. It would be naive to suggest that any reserve Career Management Plan would prove an immediate and complete panacea for all present ills, but intelligent efforts could make great improvements over the span of several years.

From the service standpoint, Career Management for the Reserve component officer would provide a reservoir of better-rounded troop commanders and staff officers with greater interchangeability. Officer personnel are developed and trained to know and understand not only command duty, but also various staff assignments. Their staff assignments are varied to cover all four principal fields: personnel, intelligence, operations, and supply. They know the problems of each staff sec-

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tion and learn the necessity of continuing coordination and cooperation among all staff officers. This results in a larger reservoir of staff-qualified Reserve officers who are so essential to the expansion of the Active Army in event of an emergency.

Career Management develops depth in command potential. Well-rounded officers whose careers have been so directed as to include command duties with subordinate units, as well as varied staff duties, possess the greatest potential as major unit commanders. Development of depth of staff and depth of command potentials is bound to improve the efficiency of all the units concerned. Further, it ensures continuity of this acquired efficiency as staff officers and commanders move up.

Benefit to the Individual

From the standpoint of the individual, Career Management principles applied to the Reserve components (Army Reserve and Army National Guard) will provide the capable officer with the opportunity to qualify for future promotions in both the command and staff fields. Qualification requires a certain amount of individual initiative. "You may lead a horse to water, but you can't make him drink!" This is true of individual development. Schooling and experience may be offered to a Reserve officer, but the offer alone does not qualify the officer for subsequent assignment and promotion. Career Management will ensure that the capable officer who has the inclination for further development and who can afford the time from his civilian pursuits is offered ample opportunities to broaden his professional (military) background and experience.

For the capable officer, Career Management also will provide a longer, more progressive, and lucrative reserve career. This, in turn, ensures the development of Reserve officers with adequate backgrounds, both in experience and education, to meet mobilization needs. The

officer who fails to keep pace with the changing military patterns of the atomic age and neglects his professional (military) education becomes inefficient in most assignments. This lack of education likewise limits assignment flexibility. Eventually, this officer loses his interest in the military and, therefore, must be pushed aside.

On the other hand, the officer who is afforded and grasps the opportunity to grow and progress, through varied assignments and appropriate schooling (military education), will retain his interest and develop an increasing efficiency. This officer has a high potential value to the service and is assured of a long career marked by regular promotions.

These two factors, value to the service and value to the individual, are so interrelated and interdependent as to become inseparable. One cannot be considered without involving the other.

Any discussion of effective training and utilization of Reserve officers (not on extended active duty) or of improving the efficiency of our country's Reserve components eventually leads to the conclusion that Career Management for the Reserve Component Officer (ROCM) is essential.

Increased Flexibility

In the military service, experience has taught that an officer must be proficient in the many varied phases of his profession. Stagnation or overspecialization in one phase of military activities denies flexibility in assignment and retains in key positions individuals not fully aware of the problems of contemporary command and staff activities. Such inflexibility adversely affects the individual officer's morale and limits the life expectancy of his reserve career. In addition, this builds a false sense of security and deceives the Nation as to the adequacy of individual reservists and Reserve component units in total mobilization. Most importantly,

it denies the Army the end-product it is seeking—A READY M-DAY FORCE.

Lack of broad training and the resulting limitations in assignment have created serious obstacles and delays in past mobilization periods. Inefficiency among officer personnel causes corresponding inefficiency in units, thus requiring prolonged training after mobilization in order to produce effective fighting units. This has been seen time and again during periods of emergency—World War I, World War II, and Korea. This may have resulted from lack of an adequate training program or lack of ability on the part of individuals (or both).

In extreme cases it has been necessary, because of untrained and ineffective commanders and staffs, to break up units (divisions) upon mobilization and to assign their component elements to other commands. This does not mean that some units and staffs have not been qualified and well-trained, to include divisions and larger units. But the numbers in this category have not been large enough to take up all the slack, even when used as cadres. In the past it has been necessary—after mobilization—to develop further in the individual members of staffs the basic understanding and team coordination required for staff work before those staffs could be used to plan, develop, and supervise the training of fighting units.

Under combat conditions officers must, for many and various reasons, be moved frequently—from troop units to staff positions, to administrative and logistical assignments, to other essential and varied assignments, and back to troop assignments. The exigencies of the service cannot be denied and the officers available must be qualified to fill the job at hand without loss of continuity or efficiency in these essential tasks. This does not mean that all officers will be able to do all jobs with equal proficiency. It does mean that each officer must be able to function in an

effective manner in any assignment commensurate with his *branch, grade, and length of service*. Additionally, Reserve officers must possess potential for further development as a result of working with skilled and qualified commanders and staff officers.

Many officers who lack the military educational prerequisites and experience for certain duties are, nevertheless, assigned to those duties. Unit commanders are reluctant to release educationally unqualified unit personnel to attend United States Army Reserve schools and are likewise reluctant to release these same individuals and to replace them with school-trained individuals. Therein lies one of the greatest weaknesses of our Reserve component forces today.

CONARC Guidance

United States Continental Army Command has recognized this weakness and the requirement for guidance in this area. The following is an extract of a recent directive published by that headquarters in implementation of the requirement to develop better qualified individuals, staffs, and M-day units:

"1. It is desired that immediate action be initiated to ensure that USAR officers become qualified to assume upon mobilization command and staff responsibilities commensurate with their grade and branch.

"2. To implement the above policy, personnel records of USAR troop program unit officers, including unit commanders, will be reviewed to ascertain if they have completed or have constructive credit for service school courses commensurate with their grade, branch, and assignment.

"3. All officers who do not meet the educational prerequisites will be given an opportunity to qualify themselves by participating in the following school type training:

a. Army extension courses, which can be accomplished in addition to their unit

assignments. Satisfactory completion, in the time prescribed by the appropriate service school, will be required.

b. As attached students in USAR schools, which can be accomplished by partial relief from their unit assignment while attending the course.

c. As students at Active Army service schools, which can be accomplished by temporary relief from their unit assignments.

d. As assigned students in USAR schools by relief from there unit assignments.

"4. Officers who do not desire to qualify themselves professionally will, at the discretion of the Army commander, be released from unit assignments.

"5. Maximum effort will be made to utilize the reservoir of USAR school graduates as replacements for troop program unit officers released from unit assignments."

Solution

This is only the beginning. The final answer to ensuring a competent, qualified M-day force is a coordinated (selective and directed) development program for Reserve officers implemented by Career Management for the Reserve Component Officer (ROCM). In the absence of personal incentive and directive guidance from higher headquarters, there is little prospect and no requirement that individual Reserve officers will avail themselves of the pertinent education available. Rather, they are likely to continue to perform their currently assigned duties for several years in a manner considerably substandard to that which unit efficiency demands and proper education would permit. Many of them fail to make any improvement in military knowledge and training during such assignments—they figuratively "stop in their tracks." Then, in event of a national emergency, the Army is crowded with individual Reserve officers of limited ability—less than quali-

fied to execute the jobs normally expected of their rank, branch, and years of service. This results in a delay in developing efficient fighting units. No longer can such delays and inefficiency be tolerated. The present concept of future war in the atomic age makes mandatory a full complement of Reserve units, each commanded and staffed with well-qualified officers, which can become fully effective with a minimum of training after M-day. As Secretary of the Army Brucker said recently:

The very nature of global war decrees that the Army become increasingly flexible and mobile. It also decrees that a high state of preparedness exist at all times in both our active and RESERVE FORCES. (Emphasis added.)

How can we produce such units? The means are available: tables of organization and equipment (TOE) units (divisions and logistical commands), tables of distribution (TD) units, United States Army Reserve schools (USAR schools), and a home study educational system for all levels (extension courses)—all these are in existence today and are included in the current reserve troop basis and Army Educational Program. In addition, quotas to Active Army service schools are available to those Reserve officers who can spare the time from their civilian pursuits. The missing step so urgently needed is the provision of authoritative direction of effort to guide Reserve officers along the desired (planned) courses to obtain these results.

Before discussing the mission of a Career Management Program for Reserve component officers it should be emphasized that sound, steady evolution—not revolution—is being advocated. There is no insistence that a senior, major unit commander should be required to backtrack and pick up a particular service experience or level of military education

he might have missed during a long and faithful career. These are today's senior officers who will have to implement the plan for the benefit of their units and the younger officers in those units. Certainly, there should be definite requirements for field grade officers who still have a potential for considerable valuable service—but in its initial stages the Career Management plan should permit these officers reasonable flexibility in meeting qualification criteria. It is at today's new lieutenants and company officers that early, full implementation of the plan should be aimed. These are the officers who would benefit most and whose increased value would benefit the unit, the service, and the Nation the most. Under phased implementation the Career Management plan would be in force for all Reserve officers in the space of a relatively few years.

Mission

Career Management for Reserve component officers should be generally the same as that of the Career Management Program now applicable to Active Army officers:

1. To keep the Reserve components operating efficiently by the wise, coordinated, and appropriate assignment of qualified officers to the jobs that must be performed to carry out the Reserve components' tasks.
2. To assist each Reserve officer—during peacetime—to develop his professional qualifications to his utmost capability by means of planned rotation through various broadening assignments and by appropriate military schooling.

In today's Reserve components we have many "professional students" (individuals who go from one school assignment to another, either never seeking or never being given a troop unit assignment). Located in the same geographical areas with these "professional students" are troop units whose officers never have availed themselves of the advantage of advanced

service schooling. ROCM is the agency which would effect the rotation of such officers. *Education which is not used is wasted.* It is quite likely that unless a student subsequently is afforded the opportunity to apply the knowledge learned, either in a troop unit or in turn as an instructor in a USAR school, he will forget much of what he has learned and the service will derive no benefits from its investment.

Application

In practical application ROCM would assume a somewhat more limited role than the officers' assignment branch (formerly Career Management Division) for the Active Army. Initially, it would be limited to controlling the assignments of Reserve officers of the Ready Reserve—those active in reserve training—and this might further be restricted primarily to those geographical areas having:

1. Sizable numbers of Reserve officers (metropolitan areas).
2. TOE units (to permit rotation).
3. USAR schools (to permit rotation and to provide schooling for officers).

(It appears that because of the autonomous nature of the National Guard, a separate National Guard Career Management Organization [ROCM(NG)] at National Guard Bureau level would be in order to handle career management for National Guard officers.)

The responsibilities of ROCM would be limited in scope to:

1. Troop command assignments appropriate to grade.
2. Troop staff assignments appropriate to grade.
3. Staff duty assignments appropriate to grade.
4. Student duty.
5. Instructor duty.
6. Recommendations to revert from the Ready Reserve to the Standby or Retired Reserve.
7. Elimination—because of the evi-

denced limited potential for future development, certain Reserve officers may be faced with the choice of reverting to the retired list or vacating their commissions.

A typical application of a Career Management planning for the Reserve officer is depicted in Figure 1.

Administration

Active administration of ROCM could be based at Zone of Interior Army level (subunit at corps) with over-all coordination and policy formulation at Department of the Army (Reserve affairs) and USCONARC levels. However, basing ROCM at Reserve corps level seems more logical and feasible since the corps commander commands both the Army Reserve units (including divisions) in his area and their advisors; thus establishment of the control at corps level would facilitate its operation by virtue of the command relationship found there. Further, the advisory system, if alert to the needs of units and individuals, is in a position to assist Reserve commanders by recommending personnel actions within the Career Management policies of the corps commander and to assist the corps commander by providing data pertaining to individual reservists beyond that normally found in individual 201 files.

Control below corps level would be undesirable because of the limited perspective and scope at such a level. On the other hand, control at the Army level is undesirable because of the distance from this headquarters to the units and the presence nearby of an intermediate headquarters—corps. See typical command relationships, Figures 2 and 3.

The administration of this program possibly could be handled by Reserve (TD) units organized for this specific purpose and actually staffed by Reserve personnel. This TD unit should be geographically located adjacent to a Reserve corps headquarters.

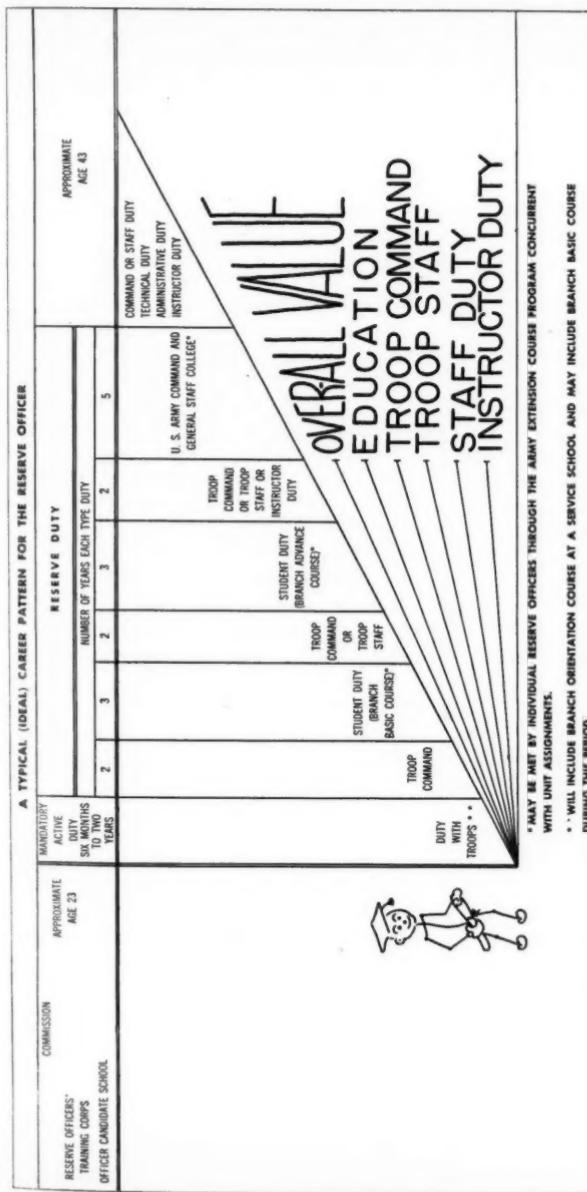


FIGURE 1

- 1. Troop Command.**—All duty in a command capacity with a tactical, administrative, training, or supply unit not to exceed a regimental (battalion) command, or group in size. (Any higher command will be as general officer, and career planning normally will be completed before an officer attains this grade.)
 - 2. Troop Staff.**—All staff duty with a tactical, administrative, training, or supply unit not to exceed a regiment (battle group), commanding, or group in size.
 - 3. Student Duty.**—All duty as a student at a United States Army Reserve school or service school.
 - 4. Instructor Data.**—All duty as a member of a staff or faculty of a United States Army Reserve school.
 - 5. Staff Duty.**—All duty as a member of a general or special staff of a headquarters of all echelons higher than a regiment, combat command, or group, or as a member of an arm or service staff.
 - 6. Technical Duty.**—Those assignments necessary to fulfill the technical and functional missions of the various technical services which are not included within the types of duty defined in numbers 5 above; for example, duty with technical boards, research activities, and others.
 - 7. Administrative Duty.**—All duties not properly classified under the preceding subdivisions.
 - 8. Individual Reinforcements.**—Reservoir of individuals to rotate through jobs (1 through 7 above).

The mechanics of administration would include periodic review of each Reserve officer's assignment, with earmarking for future assignments, and current officer assignment within each geographical area commensurate with over-all grade and space allocations and troop unit requirements within that area.

Initially, a study should be conducted by Department of the Army to provide a basis for organization or reorganization of troop program units to provide adequate unit vehicles properly to utilize currently available personnel—a step which has never been adequately exploited. Due consideration must, of course, be given to meeting emergency mobilization requirements.

Future administration of the ROCM operation would involve a rotation of officers through a pattern of duties which would provide for individual development and efficient utilization of education and special abilities.

Individual officers for whom a permanent slot is not available in a TOE unit may be attached in limited numbers to TOE (Active Army, National Guard, and USAR) units for training as an augmentation, rather than have these individuals assigned to ineffective control groups. Selection of reservists to continue in the established pattern of development and elimination or side-tracking of those officers who, for various reasons, do not or cannot qualify for continued retention in the Active Reserves would be another continuing phase of administration for ROCM.

It must be recognized that many Reserve officers will reach a point where their reserve careers will be either interrupted or terminated for various reasons. Physical disqualifications, press of civilian duties and employment, loss of interest, age, and years of service are but a few of the many factors which may be involved. In this regard, a variety of units

—each requiring varying degrees of participation, from weekly to only infrequent duties—may be necessary.

The development of professional qualifications will be controlled to a certain extent by the individual's desired degree of participation and the time his civilian occupation or profession will allow. Since the Reserve officer is first a civilian, his military activities ordinarily take the form of an avocation. Under such conditions the amount of time each individual can devote to reserve activities will vary. One specific individual will have the time and desire to spend one night a week attending drills and an unlimited amount of time during the balance of the week on associated details. Another officer may be able to devote only the one or at most two evenings a week to reserve activities. There will be others who will not feel that they can give more than one night a month to reserve training.

It is quite likely that ROCM, with its promise of promotion and guidance toward qualification for increased usefulness to the service, will stimulate Reserve officers to further activity and increase the degree of many individual's participation.

Actual assignment and reassignment of Reserve officers within the program would be effected as it now is—by means of orders published by the Reserve corps concerned. These orders, except in the event of mobilization, would be issued only after clearance and in coordination with ROCM. Upon mobilization of any major portion of the Army Reserve components, ROCM should be phased out until after hostilities have ceased.

Problems

Creation and administration of ROCM will present many problems, some of which can be anticipated. As in the establishment of any new system, sufficient latitude and flexibility must be built in to

**TYPICAL ORGANIZATION FOR THE ESTABLISHMENT
OF A RESERVE OFFICERS' CAREER MANAGEMENT PLAN**

**USING RESERVE CORPS ORGANIZATION
(ARMY RESERVE)**

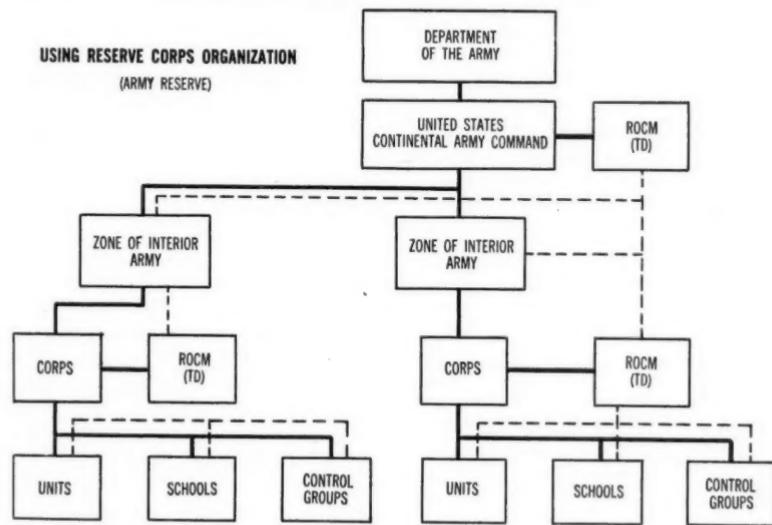
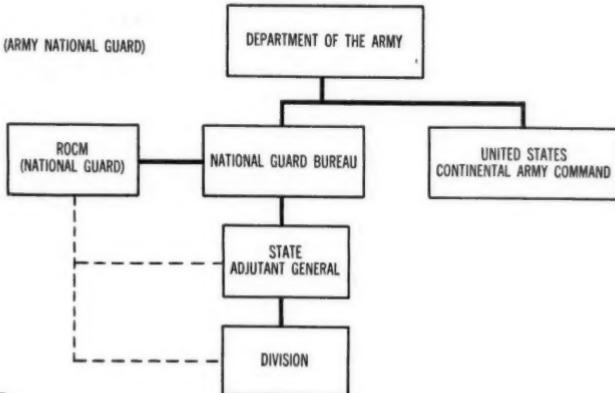


FIGURE 2.

(ARMY NATIONAL GUARD)



LEGEND

ROCM—RESERVE OFFICER CAREER MANAGEMENT UNIT (MANAGED BY RESERVE OFFICERS)

— COMMAND

— LIAISON

FIGURE 3.

permit adaptation within the scope of the mission.

The geographical problem will be one of the greatest. Reserve officers living and working within a certain area cannot be expected voluntarily to travel long distances to perform duties with a troop unit or to attend schools. A greater decentralization of troop units and the establishment of additional types of small units with better geographical dispersion may be the answer. In this respect, schooling at the United States Army Command and General Staff College level does not present the same problem because of the availability through USA CGSC of extension courses and USAR School Associate Command and General Staff Courses, and a combination of extension course work and active duty for training periods. Other service schools offer similar and varied means for the Reserve officer to acquire the desired military education.

USAR schools will make advanced education readily available in the larger centers of population. In smaller communities the same levels of education are available to Reserve officers either on a detached basis (category two students) or through extension (correspondence) courses. For those students who enroll in a category two status, the work throughout the winter months is on an extension course basis, with two weeks of active duty for training scheduled during each summer.

In this connection it is highly desirable that students actually attending USAR schools as students or taking the same courses in a category two status be relieved from assignment to TOE units for the duration of such school duty, thus permitting them to concentrate their limited time to their education. Since the student officer is, in most cases, not available for training with a TOE unit during his school tour, and since other school-trained officers will be available to fill (tempo-

rarily or permanently) the vacancy created by his reassignment, the best interest of the TOE unit will thus be assured.

There may be instances where individual officers will be able to do extension course work and retain their TOE assignments. Maximum emphasis and priority should be given to actual attendance at USAR school courses where available, because of the increased value derived from this educational medium by the presence of a fully qualified instructor.

Pay status as it exists today presents another serious problem. Many officers presently assigned to troop units in a 24-48 pay status would hesitate to participate voluntarily in a Career Management Program which they knew might later transfer them to a school assignment as students on a no-pay status. There are many examples today where troop unit commanders do not recommend officers for assignment to USAR schools for this very reason. This may be a false loyalty. In the long run the loyal and dedicated officer, who has spent many years of effort in recruiting for and building up a Reserve unit, may jeopardize his future promotional qualifications if he does not take advantage of schooling available to keep him branch and grade qualified.

The argument has been presented that pay status should have little or no bearing on an officer's degree of participation or his willingness to prepare himself for the future. Patriotism has been cited as adequate incentive. While most individuals are positively patriotic, in peacetime their patriotism does not reach their pocketbooks, or, we might say, falls short of their desire or need for personal income. In the recent past many officers attended USAR schools and performed duty with troop units without any pay for their services. Then, with the advent of at least a little pay for most assignments, a new psychological situation developed. The officer who formerly voluntarily performed

reserve duty without pay (in a student status with a USAR school), who then moved to a TOE unit (48 drills per year) and was paid for such duty and now finds himself returned to a no-pay status as a student, hesitates to volunteer for another assignment (student status) in a lower or no-pay status (12 or 24 drills per year). This is only human nature.

In the time since paid status was first authorized, the Reserve forces have shown considerable growth. Some of this growth was due to the obligatory Reserve program. But it must be recognized that individuals could *draw one day's pay for a two-hour evening training assembly*. It is also recognized that many key officers devote much more than two hours in accomplishing their assigned tasks. The pay status has an undeniable appeal to today's citizen-soldier.

To correct the situation a complete re-evaluation of pay status with a view toward eliminating some of these problems may be necessary. Troop unit and school assignments may have to be equalized for pay purposes (the former at a reduced rate compared to current pay in order to support some pay for student status). TOE unit assignments should have the highest pay status. Next would come other types of assignments with less frequent participation and proportionate pay status. This category would include mobilization designees and technical specialists.

Satisfactory progress in personal and professional development might well be included in determining a Reserve officer's qualification for pay. The establishment of minimum requirements, including school and applied education, for retention of any individual on a paid status would provide a very tangible incentive for personal progress. At the same time, such requirements would ensure for the service an adequate return for the investment made.

Command Functions

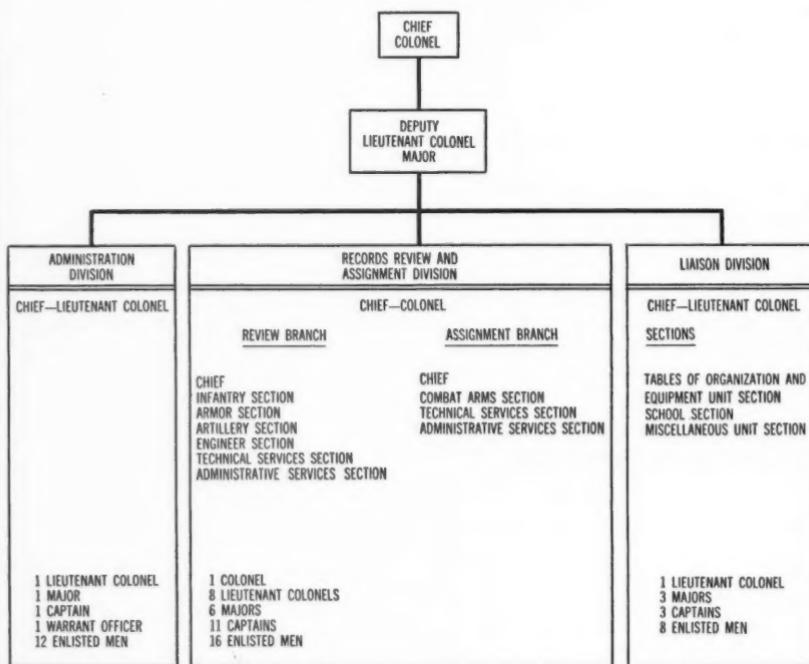
Command responsibility may pose a problem. While ROCM will be directive in nature, commanders must be "sold" on the advantages of Career Management for Reserve officers. They must realize that this is not just another administrative burden or another hurdle to overcome (or a procedure which they must learn to circumvent), but that Career Management is a tool to be used in improving the effectiveness not only of the individual officer and his own unit but the US Army M-day force.

Each commander also will have to realize that the implications of ROCM will apply to himself as much as to any of his subordinates. They also must be impressed with the importance of careful selection of individuals for development.

The efficient and responsible commander will recognize potential future value in his officers, encourage and help them to further their military educations, and weed out those who do not possess such potential. Those whom he selects for advancement may be the future commanders of his own unit, and in their hands he is placing the responsibility for maintaining and continuing that which he has spent time and effort to build. He will find and use effective methods of selection and rejection. He will utilize men of lesser capability in appropriate assignments or administratively separate them in such a manner as to avoid damaging the morale and esprit of his organization.

Conservation of capable personnel, particularly in time of national emergency, is essential. The commander must be able to bring out the best in his officers. No commander, no matter how stoic, can afford the luxury of arbitrary rejection of individuals on whom time, effort, and money have been spent in development and training. At the same time he must remember that *no further investment should be made*.

**TYPICAL TABLE OF DISTRIBUTION (TD)
FOR
A RESERVE OFFICERS' CAREER MANAGEMENT UNIT**



PERSONNEL RECAPITULATION

BRANCH				
	COMBAT ARMS	ADMINISTRATIVE	TECHNICAL	TOTALS
COLONELS	2	—	—	2
LIEUTENANT COLONELS	8	1	2	11
MAJORS	4	3	4	11
CAPTAINS	8	3	4	15
WARRANT OFFICERS	—	1	—	1
ENLISTED MEN	10	18	8	36

FIGURE 4.

in those individuals who have already reached their maximum capabilities.

We have never known a time when there existed an excess of leaders at any echelon. To meet the sudden demands for trained, efficient personnel—which most certainly would occur at the outbreak of any future war—it is essential that every effort be expended *today* to provide our Reserve components with an *effective* personnel training and development program—*Career Management for the Reserve Component Officer.*

Implementation of such a plan within each of the Reserve corps scheduled for activation within the six Zone of Interior armies could utilize many capable and qualified Reserve officers now assigned to units (control groups) without a purpose or mission.

Utilization of these personnel in establishing ROCM would involve only a small

percentage of the strength of control groups, while returning much benefit to the Reserve components.

A typical Reserve Career Management Unit (cellular) is shown at Figure 4. This organization should be able to take care of the corps with a typical troop population (20,000). Certain deletions and additions may be made where the troop population is more or less dense.

Summary

Career Management within the Reserve components would be a step in the right direction—an essential evolutionary process to provide a Reserve Officer Corps wherein the best could be selected, trained, and promoted to positions of maximum responsibility; the average could be trained and utilized to the full measure of their capabilities; and the mediocre and incompetent could be sought out and eliminated.

A basic premise of all Army plans and programs stems from the concept that the Active Army, the Army National Guard, and the Army Reserve are a composite entity. We are not three separate segments which become a whole only when joined together by some emergency. We are one Army. We must plan as one. We must organize as one, and if we must fight a war, then we will fight as one.

The law requires that the Army (including all three elements) be organized, trained, and equipped for prompt and sustained combat, and that it support and maintain national policies and objectives.

Secretary of the Army Wilber M. Brucker

ARMY ROTC

Lieutenant Colonel Maurice K. Schiffman, *Infantry*
Chief, ROTC Branch, Headquarters Sixth Army

TOO few military personnel and civilian educators know of or understand fully the present value and past contributions of the Army Reserve Officers' Training Corps (ROTC). The future of this officer producing program should be of vital interest in view of the current reductions in personnel and the present budgetary limitations.

The Army ROTC exists for the purpose of developing officers in sufficient quantity to provide a corps of leaders for rapid mobilization in the event of a national emergency. Upon completion of the advanced course, ROTC cadets are eligible for appointment in the US Army Reserve or Regular Army and for service in the Active Army.

Establishment of the Corps

Although the ROTC was officially designated as such by Section 40 of the National Defense Act of 1916, which outlined a Program of Instruction, and authorized graduates of the ROTC to be commissioned second lieutenants in the Officers' Reserve Corps (ORC), the military training program in colleges dates back to the founding of Norwich University, Northfield, Vermont, in 1819. Many schools followed the concept of military training in a poorly supported and uncoordinated program. The first important step toward a universal program of instruction resulted from passage of the "Morrill Act,

1862," which granted public land to those educational institutions including the curriculum agriculture and mechanical arts; and offering a course in military tactics.

It is necessary to digress at this point and elaborate on the Morrill Act to clarify a present-day misconception. Following the National Defense Act of 1916 many institutions used the medium of ROTC to meet the "land-grant" provision of offering a course in military tactics. We speak of the "required" and "elective" military science courses for the first two years of college (basic senior division ROTC); however, the requirement is placed on the student by State law, or institutional officials and not by the Department of the Army as many persons believe. Nothing in the Morrill Act required the student to pursue a course in military tactics, the proviso was to the effect the institution offer such a course.

Only land-grant colleges originally were provided with instructor personnel support, and equipment furnished the institution on loan. By 1888 additional legislation included other than land-grant institutions in the assistance authorized to be given by the Army. A total of 79 colleges and universities offered military instruction by 1893 at which time a recommendation of the Secretary of War was adopted to extend the program to the high schools.

The Reserve Officers' Training Corps program is a valuable source of officers for all components of the Army. The future of this program is of vital concern to both the service and the educational institutions

Participation in Past Wars

The ROTC as such cannot be credited for participation in World War I; however, its predecessors, the alumni of the land-grant institutions—estimated to number at least 100,000 of which approximately 30,000 were officers—did serve in World War I.

The newly created ROTC of 1916 was short lived for although many new units were established the War Department suspended the program in November 1918 and established a Students' Army Training Corps (SATC) which trained enlisted men for special assignments but not for commissions. The ROTC students of the World War I period, however, were able to continue military training and receive commissions through a program similar to the Officer Candidate Schools. Following the armistice the SATC was discontinued and the National Defense Act of 1916 was amended on 4 June 1920 to reestablish the ROTC and to provide Federal aid in the form of uniforms, equipment, and instructor personnel.

The Reserve Officers' Training Corps was reorganized in secondary and collegiate institutions of the Nation and a comprehensive program undertaken for the training of candidates for commissions in the Officers' Reserve Corps.

By the opening of hostilities in World

Lieutenant Colonel Maurice K. Schiffman was graduated from the U. S. Army Command and General Staff College in 1951. He has had experience in all branches of Reserve components including duty as a member of the ORC in California with the 91st Infantry Division; Chief, ROTC Texas Military District and ORC Unit Instructor, Fort Worth, Texas; and Chief, ROTC Fifth Army, Chicago. He served as Chief, Combat Intelligence Division, G2 Section, Headquarters X Corps in Korea; Chief of Plans and Collection Branch, G2, Eighth Army; and Assistant Senior Army Advisor, California Military District, Sixth Army Headquarters. He presently is assigned as Chief, ROTC Branch, Headquarters Sixth Army, Presidio of San Francisco.

War II commissions had been awarded 125,000 graduates of which 7,000 were furnished the Regular Army, National Guard, and Marine Corps. By 1944 their ranks had been increased to a total of 159,000 commissioned with another million and a half students receiving some ROTC training between 1920 and 1942.

In June 1943 the ROTC again suffered a setback when the advanced course was suspended for the duration of the war. Approximately 100,000 ROTC graduates served from second lieutenant to brigadier general during World War II, certainly the backbone of a Reserve corps that greatly influenced the final outcome of this period in history.

The termination of the Second World War strengthened the Reserve components with an influx of experienced staff officers and commanders, a large percentage originally commissioned from ROTC.

The postwar period brought to life a revitalized ROTC which again was able to contribute to its country's defense. During the Korean conflict 70 percent of the Army's 26,751 lieutenants called to active duty between September 1951 and June 1953 were ROTC graduates.

Reorganization

The Branch Material ROTC program was out of balance in the overproduction of second lieutenants in services such as Quartermaster Corps, Military Police, and Transportation, while a shortage existed in the combat arms. To alleviate this situation a General Military Science (GMS) curriculum was established which provided the flexibility of commissioning in branch at the termination of the course in accordance with the requirements of the Army. Substantial economy resulted in reduced equipment requirements, maintenance costs, and instructor personnel.

The 1952-53 school year GMS program was considered so successful in the original 59 institutions participating that in August 1953 the Assistant Secretary of

the Army dispatched a letter to all college heads encouraging them toward conversion from the branch program to the GMS program; however, the final decision was left to the discretion of the institutional authorities. Some institutions, where *esprit de corps* of the branches remained paramount, have not converted to date and at present with 189 colleges and universities offering the GMS program, Branch Material training is conducted in 45 institutions.

The ROTC Program of Today

The educational system of the United States Army is all encompassing and foremost among its contemporaries is the Reserve Officers' Training Corps which numbered at the beginning of school year 1957-58 approximately 144,000 students in the senior division (colleges and universities). In addition, the junior division (high school) enrolled 60,000 students, the Military Schools division 11,000, and the National Defense Cadet Corps units (formerly known as 55c schools as authorized under Section 55c of the National Defense Act) 16,000—a grand total of 230,712 students in 628 educational institutions.

In the last school year the Army ROTC produced almost twice the number of Regular Army officers than did the United States Military Academy.

Army ROTC Flight Training Program

Public Law 879 of the 84th Congress amended the National Defense Act to include flight instruction for members of the ROTC in Army, Navy, and Air Force units. What this four-year trial program means to the Army is that selected senior students in the advanced ROTC program may, through successful completion of a 70-hour extracurricular ground and flight instruction, qualify for a career in the Army Aviation program. The flight training will be conducted by approved civilian flying schools and under instructors certified by the Civil Aeronautics Administration (CAA). Students applying must con-

tract for three years' active duty, be in the senior year (Military Science IV), and pass a rigid flight physical examination.

A summary of operation of the Army ROTC Flight Training program reveals that the program has accomplished its mission and engendered considerable student and institutional interest. Of the 254 students from 25 schools that participated during the first year of operation, 202 successfully completed the course.

There are approximately 600 students enrolled in flight training in 56 institutions during Fiscal Year 1958. Based on last year's attrition factors, approximately 500 students will be trained and eligible to apply for Army aviation upon completion of the year's program. It is planned to train 625 students during Fiscal Year 1959.

The Junior ROTC Program

The Junior Division ROTC Program (high school) previously mentioned is more controversial than any of the associated divisions. First of all, it is not officer producing, second, the mission is to develop leadership and better citizens rather than place emphasis on the military product; and last, it is a costly program from which the benefits to the individual, the community, and the Army are too intangible to be statistically evaluated.

At the present time this program is *status quo* and no further expansion is contemplated. Many new and modern high schools are being built and educational authorities would like to see the ROTC established, but with the present personnel cuts and austerity program it is not feasible. The Army presently is supporting the existing program to the optimum degree. A study prepared by the Office of the Comptroller of the Army for the academic year 1951-52 determined the average cost to the Army for each student in the junior program to be 110 dollars annually, this excluding the pay of officer and enlisted instructors. If a similar study were to be

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made considering rising costs, it surely would indicate a substantial increase subsequent to 1952.

Despite the cost and the intangibles involved, the continued support of this program is recommended for the foundation of intelligent citizenship, the good will produced toward the Army in each community, and the lasting praise of the Army High School ROTC by the graduate regardless of the service, if any, in which he may serve.

Recent Trends in Senior ROTC

Newspapers throughout the country have reported isolated instances in institutions offering military training where students have petitioned the governing board to eliminate the "required" basic ROTC course. The result will vary with each institution if affirmative action is taken. The immediate effect will be a sudden drop in freshman enrollment in ROTC. This will be the group of students who have no desire to enroll in military science. In this group will be some potential leaders whose interest would have been aroused if the first two years had been required; how many, is an intangible factor.

The freshmen who do enroll in the "elective" program are those desiring the training, and a large percentage intend to continue with the advanced course ultimately to be commissioned in one of the Reserve components (United States Army Reserve or National Guard of the United States), or seek a Regular Army career.

The effect of a change from required to elective ROTC reduces the requirement on the Army for instructor personnel, equipment, and uniforms. Classes are smaller and more personal instruction can be achieved.

The end result of such a conversion as to the potential leaders lost, weighed against the economy effected, is another intangible. However, the continual failure of an institution to meet the minimum

quota of 25 commissioned officers annually could result in loss of the unit to the institution, certainly a factor to be considered.

ROTC of the Future

Several important problems face the senior ROTC program. For the Army the problem is contingent on the adequacy of the operating funds to be provided and sufficient personnel to staff the instructor groups. For the institutions the problems are not as readily defined; each school differs in student enrollment, facilities available, financial and administrative aid budgeted for the Department of Military Science, and the continuation of required basic ROTC as opposed to the elective program.

The future of the ROTC program has become so acute that representatives of the "Tri-Association" (American Association of Land-Grant Colleges, the State Universities Association, and the National Association of State Universities), with President John A. Hannah, Michigan State University, as spokesman, met on 1 October 1957 with the Armed Forces Policy Board to discuss this subject. Although the agenda included Navy and Air Force ROTC, the Army portion only will be discussed here.

The key educators of the Nation vitally were interested in two fundamental points, the Army attitude toward support of the ROTC and the effect of required basic ROTC as contrasted to elective. The first is a long-range problem which refers principally to the facilities legislation and which was answered by Army Secretary Brucker that the proposed legislation to assist the institutions in building military training facilities on a 50-50 Federal fund matching basis was supported by the service. A recent Department of the Army letter to Professors of Military Science and Tactics indicated that the entire problem of facilities legislation was to be reopened for study. The lack of accelerated

action to reach a decision on this issue is of primary concern to the Army PMST's since many state legislatures and institutions have given low priority to proposals for construction of ROTC facilities pending the outcome of Federal assistance. On the other hand, to quote President Hannah, "Service inspectors annually criticize our institutions for not providing adequate facilities."

The consensus of the educators toward required basic ROTC was that many young men entered the advanced course to qualify for a commission after being motivated by the required basic course. The reaction of members of the Armed Forces Policy Board supported this view in an emphatic statement by Secretary of the Army Brucker stressing the Army's dependence on the ROTC program and its firm belief in the value of required basic ROTC. This was seconded by Assistant Secretary Hugh Milton who said, "The Army believes, and has always believed, in the value of required ROTC."

The strong statements for the continued support of ROTC by these and other military leaders, as reported to Presidents of Member Institutions of the Association of Land-Grant Colleges and State Universities (Circular Letter #27, 16 October 1957), should assure other educators of the value placed on ROTC by the Army Establishment.

Conclusion

The short history of the Army ROTC, the present status, and the potential of the future have been offered to present pertinent and practical thoughts on one of the Army's most valuable educational programs.

The organization that furnished a core of nearly 100,000 officers in World War II, and presently furnishes the majority of officers to the Regular Army warrants considerable study before any reduction or revision of the program is legislated. The ROTC occupies an important place in the Army's contribution to the national defense efforts.

I know of no startling advances or marvelous breakthroughs on the keystone of our national security—our superb American fighting man. He must still push forward against any odds; he must still help to keep the peace or win success in battle through his own courage, skill, experience, resourcefulness, and fighting heart, but we must use him more effectively with all the resources at our command if he has to fight.

It is our task in Army Research and Development to develop the weapons and equipment that will make it possible for him to fight, to survive, and to win and control the ground in this missile and atomic age if war is again forced on us.

Lieutenant General Arthur G. Trudeau

KEEPING PACE WITH THE FUTURE--

The Department of the Infantry Division

Colonel Lee Wallace, *Infantry*
Faculty, U. S. Army Command and General Staff College

In order to serve as a true instrument of the Nation's defense in today's world, the Army must be prepared for combat action in any sector of the globe—in jungle, arctic, desert, or temperate climates—under conditions of limited 'police action' or all-out general war with conventional or atomic weapons as the situation dictates.

—Wilber M. Brucker
Secretary of the Army

This is the tenth in a series of articles expanding various aspects of "USA Command and General Staff College Keeps Pace With the Future," written by Major General Lionel C. McGarr, USA, Commandant of the College, and published in the April 1957 issue of the MILITARY REVIEW.
—Editor.

SECRETARY Brucker's statement aptly describes the Army's responsibilities as a member of the triservice team. The infantry division, as a principal combat instrument of the combined arms, must be prepared for employment wherever and whenever needed, using today's weapons, today's organization and doctrine; however, full recognition must be accorded the irresistible wave of progress and the challenge can be met only by anticipating and preparing for the battlefields of the future.

The task of adequately preparing the

commander or general staff officer has taken on new proportions. Decisions based solely on analysis and review of past experience and problems solved with tested factors alone will no longer suffice. The United States Army Command and General Staff College plays its part by pursuing an educational philosophy which will impart fundamental knowledge, together with the requisite flexibility of mind necessary to keep pace with the future. Perhaps even more essential than technical excellence is a very high order of those basic qualities which from the beginning of history have distinguished armies from mobs—character, integrity, moral courage, and discipline.

Department of Infantry Division Mission

The mission of this department is to develop a course of study which provides the student with experience in making and executing decisions, and military problem-solving in the area of infantry division operations, including administrative sup-

Providing experience in making and executing decisions and military problem-solving in the area of infantry division operations, characteristic of present and future warfare, is a part of the USA CGSC's over-all mission of adequately preparing commanders and staff officers

port aspects, so as to develop fundamental understanding of the capabilities of the infantry division in the wide variety of probable roles, operational environments, and types of operations characteristic of present and future war. Additionally, the department is responsible for the development and improvement of doctrine in these fields within the College area of responsibility.

Organization

The organization of the Department of the Infantry Division (DID) was directed by the Commandant on 4 December 1956

for infantry division instruction to a single department contributes to significant improvement in the doctrinal field and in the development and presentation of instructional material. Within well-defined College curriculum controls, the department chief can ensure a balanced, comprehensive choice of subject matter, prevent overlap and unnecessary repetition, and concurrently uncover and recognize areas requiring a more forward-looking doctrinal approach.

The internal organization of the department (Figure 2) into an offense section

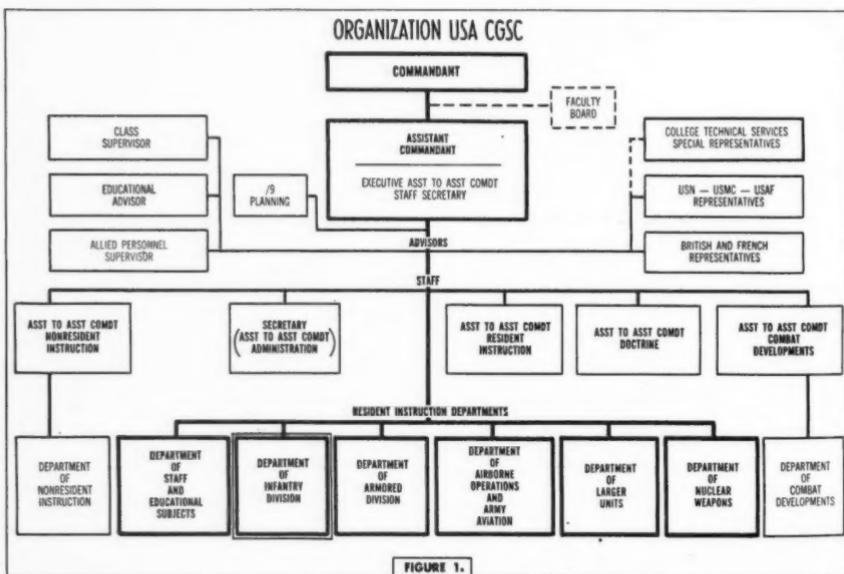


FIGURE 1.

as part of the over-all reorganization of the College.¹ Within the framework of the College organization (Figure 1), DID was designed for the planning, preparation, and presentation of the infantry division course of study and developing necessary supporting doctrine within the over-all curriculum. Assignment of responsibility

and a defense section is largely an administrative arrangement based on department size, because the department recognizes that the distinction between offense, defense, and retrograde tends to decrease in the fluid conditions of the modern battlefield. Also, this internal arrangement serves to define responsibilities within the department and is helpful to author-instructors from other departments in the

¹ "USA Command and General Staff College Keeps Pace With the Future," Major General Lionel C. McGarr, *Military Review*, April 1957.

coordination of the preparation of their own subjects.

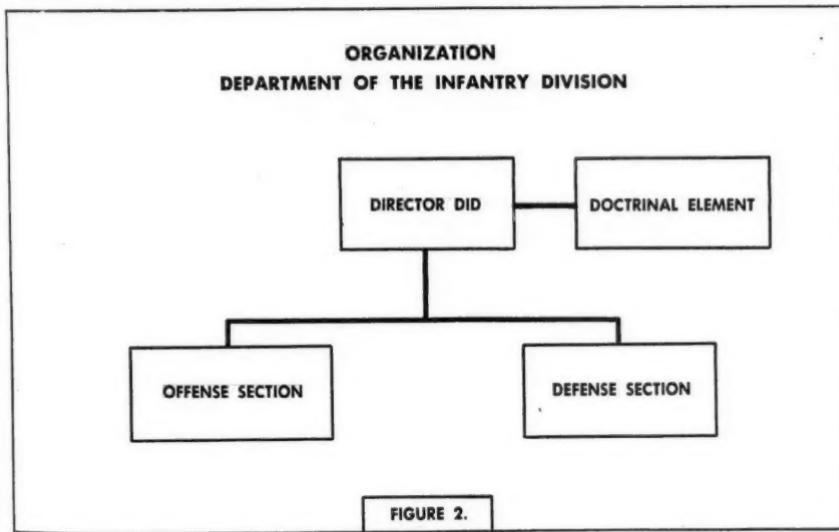
Author-instructors assigned to the offense section are charged with writing and presenting basic and applicatory instruction in all phases of operational and administrative support aspects of infantry division offensive operations, to include river crossings and night operations in operational environments ranging from conflicts short of war and limited war to general atomic war.

The defense section's primary area of

system and as an integral part of division operations in the field.

In order to broaden instructor background, stimulate new ideas, and to prevent overspecialization of author-instructors assigned to DID, all platform instruction described above is assigned and conducted by author-instructors of both the offense and defense sections without reference to section assignment.

The doctrinal element, a new College organizational feature developed in the 1957-58 academic year which serves as a



responsibility includes writing subjects and instructing in all aspects of infantry division defensive and retrograde operations under conditions described above, and additionally, basic and applicatory instruction in principles of military operations, fundamentals of combat, artillery and missile instruction, the organization and characteristics of the infantry division, and the organization and function of administrative support including both separate treatment of the division logistics

focal point for the development and coordination of doctrine, is discussed later in this article.

Curriculum Planning

The DID course of study serves as an important foundation element for the overall College curriculum (Figure 3). Much of the fundamental instruction common to all divisions in combined arms operation is presented by DID early in the school year. This is possible because of the less

specialized nature of the infantry division which permits the Department of the Armored Division and Department of Airborne Operations and Army Aviation to concentrate on the diverse characteristics of armor and airborne in their courses of study. Also, by portraying infantry divisional operations (along with those of armor and airborne divisions) in a realistic corps and field army framework, a

includes delineation of the purpose of the DID course of study and its allocation of curriculum hours. These decision papers and subsequent College Guidelines which amplify them furnish College level controls regarding subject locales, forms of war, scale of use of atomic weapons, phasing of instruction, subjects to be emphasized, and other necessary information relative to fundamental and integrated

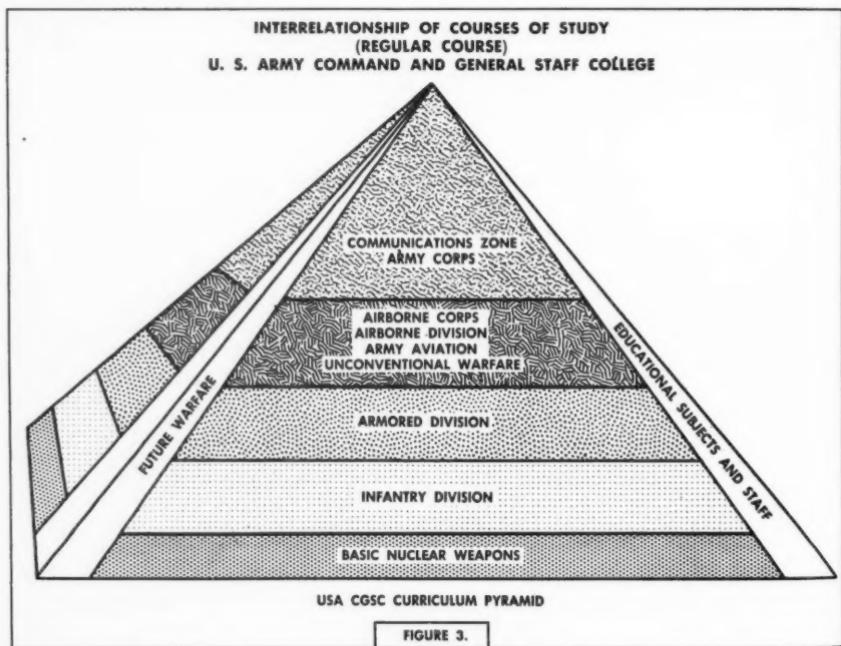


FIGURE 3.

sound basis is provided for later instruction at larger unit levels.

Department curriculum planning is co-ordinated by its curriculum planning officer. Planning and coordination commences with promulgation of the Commandant's guidance and decisions and continues through to the presentation of instruction in the following manner:

The Commandant's Annual Curriculum Guidance and Decisions on the Curriculum

instruction. Based upon this guidance, DID prepares a College Directive for each proposed subject.

The College Directives when approved break down the block of hours assigned to DID into individual subjects based on the College Guidelines. Each directive sets forth the subject number, number of hours, phase of instruction, title, methods of instruction to be used, locale, type of war, scale of use of atomics, general commit-

ments as to the purpose and scope of the instruction contained in the subject, and an analysis of improvements proposed in similar subjects presented the preceding year. After analysis by the staff, these College Directives are then briefed to the Faculty Board membership and the Commandant. This review affords the Commandant and his staff plus all department chiefs a detailed view of the DID course of study. Similar presentations by all other instructional departments provide key individuals with a comprehensive view of the curriculum as a whole and provides additional interdepartmental coordination at this early stage of curriculum planning. When approved by the Commandant, these College Directives become directives to DID, and constitute the DID portion of the College Curriculum Plan.

Next, with the chiefs of the offense or defense sections, the Director of DID designates authors for each of the subjects listed in the College Directive. Based on College Guidelines and under the supervision of his section chief, each author prepares a Department Directive for his particular subject. This directive is more detailed than the College Directive, including a more definitive description of the content of his subject, a strategic setting, problem sequence, subject coverage, methods of instruction to be employed,

references, and design of night study requirements. The draft directive is coordinated with other interested authors within DID, other instructional departments, doctrinal agencies, and with the Office of the Assistant to the Assistant Commandant for Resident Instruction (AAC/RI).² AAC/RI is intimately familiar with the DID course of study and this coordination provides additional assurance that new ideas are incorporated into current instruction and that undesirable interdepartmental duplication or voids are prevented. The approved Department Directive is distributed to other departments and to the staff for information and for continuous interdepartmental coordination.

Next, the author, after performing the necessary research and preliminary planning, prepares an outline plan for his subject. The outline plan is a transitional step employed to ensure an orderly progression from the Department Directive to the completed subject. The outline plan contains the author's specific and detailed proposals as to how the subject will be developed. It sets forth in detail the night study and classroom requirements the student will be expected to accomplish, the time to be devoted to each requirement, the instructional objective and instructional method to be employed for each requirement, a detailed scenario, information as to the texts or printed materials to be issued to the student, and lists instructional aids required. The outline plan is presented by the author at a formal department review. The review board consists of the Department Director, chiefs of offense and defense sections, chief of the Doctrinal Element, and two or more other experienced authors from DID. This review is attended by the liaison officer for the department in the office of AAC/RI and by authors from other instructional departments and College agencies who

Colonel Lee Wallace was graduated from the U. S. Army Command and General Staff College in 1951, the Naval War College in 1947, and the Air War College in 1955. During World War II he served in the Asiatic Pacific theater as battalion commander of the 3d Battalion, 17th Infantry Regiment in the 7th Division, and later as regimental commander of the 184th and 31st Infantry Regiments. Other assignments include duty as an instructor in the U. S. Army Infantry School and Chief of Staff of the U. S. Military Mission to the Imperial Iranian Gendarmerie. He was assigned to the faculty at USA CGSC in 1955 and now is Director of the Department of the Infantry Division.

² "Keeping Pace With the Future—Resident Instruction at USA CGSC," Colonel James L. Frink, Jr., *Military Review*, February 1958.

have a correlated interest. This review procedure ensures comprehensive coverage of subject matter and ensures the timely inclusion of the most recently developed doctrine and concepts.

Based upon his approved outline plan, the author then proceeds to prepare his subject. His directive requires him to report doctrinal gaps or improvements discovered in writing his subject and to report new concepts developed to the Chief of the Doctrinal Element, DID, who brings them to the attention of the Assistant to the Assistant Commandant for Doctrine (AAC/DOC)³ where they are handled in accordance with College procedures and US CONARC directives.

Upon completion of his subject, the author submits it to department review. The review board is constituted as for the review of the outline plan except that in some instances the presence of representatives from other interested departments and agencies is formally requested.

Control of the subject is continued through the presentation phase by visits to the classroom by the Department Director and the section chiefs as well as by the Assistant to the Assistant Commandant for Resident Instruction. Throughout the academic year continuing evaluation of each subject is conducted by such means as day-to-day student comment sheets, College periodic and course-end questionnaires, and scheduled, periodic meetings of selected students with the Department Chief.

The department responsibility for monitoring of instructional material is vested in the chiefs of the offense, defense, and doctrinal elements in order to ensure the following:

1. Coordination and adequacy of instruction conducted by DID in areas wherein the fundamental instruction presented earlier in the course is the respon-

sibility of another department; for example, integration of staff activities into infantry division problems (fundamental instruction conducted by the Department of Staff and Education) or integration of nuclear weapons and delivery systems into infantry division operations (fundamental instruction conducted by the Department of Nuclear Weapons).

2. Coordination and adequacy of instruction conducted by another department wherein the fundamental instruction was presented earlier by DID. For example, the employment of "following and supporting" infantry elements in instruction prepared and presented by the Department of the Armored Division.

3. To ensure the inclusion of the latest doctrine pertaining to the infantry division in instruction prepared and presented by DID and other instructional departments.

Infantry division instruction is not approached from the infantry point of view alone, or purely to make infantry division commanders or staff officers as such. Rather it is approached from the combined-arms point of view to develop corps and army commanders and staff officers capable of integrating the infantry division into the over-all team, as well as future division commanders. This approach to infantry division instruction also develops armored and airborne division commanders and staff officers capable of cooperating on the battlefield with infantry division commanders and staff officers.

Keeping Pace

The adoption of the Pentomic Infantry Division organization, necessity for worldwide locale coverage, progress in matériel and doctrine, new concepts for combined-arms employment, and the educational approach to College instruction result in a unique, challenging, and stimulating opportunity for a forward-looking curriculum design.

³ "Keeping Pace With the Future—Development of Doctrine at USA CGSC," Colonels Victor W. Hobson, Jr., and Oliver G. Kinney, *Military Review*, November 1957.

On 15 November 1957 the Commandant issued his command policy guidance for the /9 curriculum currently being developed. Because of the reorientation and complete rewrite of the 1957-58 curriculum, accelerated progress has been made possible in the annual corrective rewrite and refinement of the curriculum for 1958-59. Refinements are based on a year's experience with the new division organizations, further doctrinal development and technological improvements in weapons, ground and air vehicles, and communications.

Improvements in the 1959 DID course of study are designed to keep pace with progress. Most changes are being accomplished by further modernization of doctrinal content, improved integration of instructional material within subjects, or the refinement of requirements within subjects, or through creation of new subjects to replace obsolescent material.

The College curriculum is designed to graduate students capable of performing with equal facility in either active or non-active atomic warfare. In general, a subject area is covered first under active atomic conditions. The curriculum is designed to illustrate that there is normally no clear-cut distinction between atomic and nonatomic warfare, and that the level of use of atomics can vary from a high level to zero during any particular phase of an operation. Atomic warfare normally employs both conventional and atomic means; and nonactive atomic battlefields are, like active atomic battlefields, conditioned by the ever-present threat of employment of atomic weapons.

All tactical problems are placed in settings realistic to present or probable world situations with a view to increasing realism and including background political-geographical knowledge, in support of the basic educational purpose of the course. The roles, environments, and forms of war portrayed are those outlined by the Chief

of Staff, US Army, in the National Military Program and allied papers. Locales are worldwide. DID subjects are geographically located in 20 different areas of the world. Force structures reflect Army forces operating in a realistic framework of joint and combined operations. Suitable emphasis is placed on general war, limited war, and situations short of war. The curriculum as a whole thus provides an opportunity where appropriate for improved understanding of limitations in warfare.

To provide *realism* and thus add to the challenge of the situation, subjects include: changes in conditions of terrain and weather which make execution of the original plan infeasible; breakdowns in the administrative support system resulting from enemy air attacks, atomic strikes, and guerrilla and infiltration activity; radioactive fallout; large-scale losses in maneuver elements; subordinate commanders and units who unexpectedly fail to carry out their assigned tasks or missions; and other similar normal operational impediments.

Emphasis, in both tactical and administrative support situations, is placed on the Pentomic Infantry Division as a *combined-arms and services* organization, operating over the broad frontages and great depths that characterize the modern battlefield. Night operations are stressed both by inclusion of separate subjects set in various operational environments, and by their integration into additional subjects. The mobility potential of divisional elements provided with Army aviation and personnel carrier lift is thoroughly investigated, as is the operational flexibility of the division when supported by an adequate aerial resupply capability. Operations under extreme climatic conditions encountered in arctic, jungle, desert, and mountain warfare are treated in both specific and integrated instruction. The impact of extreme climatic conditions is con-

sidered in administrative support activities as well as in operations. For example, problem environments illustrate the effects of mud, snow, cold, and ice. Missiles, including the division's organic *Honest John*, and missile support available from corps and field army, are employed in all types of operations; and the status of the missile as a primary and normal fire support means is emphasized.

Instruction in fire support coordination and the integration of atomic and non-atomic fires emphasize prompt exploitation of massive firepower by highly mobile forces which are essential factors leading to domination of the battlefield. The importance of rapid, accurate intelligence and target acquisition within the division is repeatedly emphasized.

The inherent flexibility of the divisional organization leads to exploitation of the mobile forces concept and habitual tailoring of task forces designed for the specific job at hand. These forces vary in size from reinforced platoons to brigade task forces and in transportation means, from completely helicopterborne to partially motorized or mechanized units.

It is essential to develop student understanding of the present and probable future capabilities of *all* divisional elements—to develop the knowledge of each of the arms and services essential to efficient operation as a commander or general staff officer in the combined-arms team. Student thought is projected into the future by the integration of future warfare instruction and new concepts in current timeframe instruction, and by specific future warfare instruction in a future timeframe. This thinking is further stimulated by a lecture included in the College guest speaker program on new developments in infantry matériel.

For the 1958-59 course of study, increased emphasis is being placed on the infantry division's role as a part of the Strategic Army Corps (STRAC) by in-

creasing the number of subjects which portray the division in this role, and further stressing the strategic and air mobile capabilities of the Pentomic Infantry Division.

There is increased coverage of all aspects of administrative support. This coverage, already increased for this past year's course, is being further expanded for the next course. Emphasis has been accomplished in part by the preparation of new subjects demonstrating the importance of those activities to Pentomic Infantry Division operations, and by integration of complex, administrative support situations and problem areas into existing subjects embracing all types of operations and environments.

The possibilities of the future will be further examined by the inclusion of a new subject employing a future infantry type organization cast in the 1961-67 timeframe. Additional current timeframe instruction will be devoted to a discussion of the impact of new weapons, surveillance equipment, transportation means, organization, doctrine, and concepts on the type operation under consideration.

Tactical infiltration and counterinfiltration will be further stressed. A new subject designed to develop the fundamental principles and present these operations as forms of maneuver is being prepared, and the tactical employment of forces designed for these purposes is being integrated into a larger percentage of subjects in this important area. Similar integrated coverage will be increased in intelligence, air defense, night operations, unconventional warfare, and the employment of CB agents in division operations.

The purpose and the scope of each lesson are carefully analyzed to determine the manner of presentation which best suits its *particular* requirements. Emphasis is on those methods which will enhance individual problem-solving and sound decision-making abilities and assist in the development of a graduate who can clearly

and concisely transmit his decisions and/or recommendations to those who must implement them.

Wide-scale use is made of the small discussion group method of instruction. Experience in the 1957-58 academic year has proved the value and efficiency of the small group activity. Work groups are composed of Army officers of various combat arms and technical and administrative services to produce a balanced composition. Air Force, Marine, and Navy officers are distributed throughout the groups to the extent they are available. The presence of sister service and Allied officers fosters joint and combined aspects of instruction. The wide range of past assignments and professional knowledge represented in each discussion group, plus the informal atmosphere, stimulates discussion and results in meaningful subject analysis.

The distribution throughout the work groups of Allied officers (110 Allied officers representing 44 nations are attending the 1958-59 courses) also provides an opportunity to strengthen cultural ties, and foster a better understanding of the political and economic conditions in the free world as well as military problem areas confronting our allies. Additionally, these outstanding Allied officers contribute valuable experience, new and fresh ideas, and a detailed knowledge of many areas of the world. This unique opportunity for professional and social integration is fully exploited.

Doctrinal Responsibility

The accelerated evolution in firepower that has already occurred in warfare demands many new tools, tactics, and techniques—but before men can act in new patterns, they must think in new patterns.

—General Willard G. Wyman

General Wyman's statement outlines a critical objective of the current doctrinal effort of DID, that is, the channeling of student and instructor thinking into new and forward-looking patterns in all areas

of Pentomic Infantry Division employment. Fully aware of the mutually supporting nature of the USA CGSC's doctrinal and instructional mission, DID is organized and staffed for the task of providing thoroughly modern doctrine within its area of responsibility. The requirement for a bold doctrinal approach is dictated by constant and rapid technological advances in matériel and their impact on the organization and employment of today's units. DID, under the coordinating staff supervision of the Assistant to the Assistant Commandant for Doctrine (AAC-DOC) is charged with development of current doctrine in all fields applicable to the Pentomic Infantry Division to include a thoroughly modern doctrinal basis for current timeframe instruction, and also the preparation of modern training literature for use throughout the Army.

DID also participates in combat developments projects relative to future warfare and presents instruction in this increasingly important field. In the field of future warfare the department maintains active working contact with the Department of Combat Developments (DCD) which has the primary College responsibility for the development of "future doctrine."

Officers assigned to the doctrinal element conduct detailed full-time study and research in the doctrinal field and coordinate with other departments and representatives of pertinent agencies outside the College in order to anticipate scientific development and the rapid evolution of combined-arms doctrine. Author-instructors in the detailed research necessary for writing instructional material uncover specific areas requiring the formulation and interpretation of doctrine, and classroom examination and discussion also provide a significant contribution. Conferences with officers attending the Senior Officer Nuclear Weapons Employment Course have been especially rewarding, as have

scheduled conferences with selected groups of Regular and Associate Course students which are held throughout the year. These reports, conferences, and comments assist in a continuous evaluation of current doctrine and the development of new concepts.

Studies currently being conducted include the interrelationship of weather, terrain, and nuclear weapons effects; evaluation of frontages and depth of divisional operational areas; and new concepts involving nuclear weapons employment.

Summary

New conditions require for solution, and new weapons require for maximum application, new and imaginative methods. Wars are never won in the past.

—General Douglas MacArthur

The Department of the Infantry Division, USA CGSC, attaches particular significance to the future. Instruction at the

College, while in no way disregarding the lessons learned in the military achievements of the past, emphasizes the challenge of the future. Throughout history there has been resistance to change and DID intends to do its part in developing leaders who are intolerant of unimaginative thinking and who refuse to travel in the rut of inertia. The job at hand is to provide a thorough understanding of the infantry division as a key component of the triservice team—for employment on the atomic and nonatomic battlefield—in all operational environments, and in any part of the globe. This is a mission of the first magnitude. The course of study presented by this department is designed to stimulate student and instructor thought, not only relative to the situation of today, but of the rapidly expanding capabilities and responsibilities that will be here tomorrow.

In this crescendoing age, resistance to change is like mud on the spikes of a sprinter. Too much of it and we could lose the race. Long-range plans for national defense *must* be subject to constant change. Rigid adherence to pre-conceived forms of response to the challenges of our fast changing environment would be suicidal. Flexibility—not rigidity—*must* be the watchword of our day.

General Willard G. Wyman

MILITARY NOTES

AROUND THE WORLD

UNITED STATES

Improved 'Bomarc'

An advanced version of the *Bomarc* surface-to-air missile is under development. It is expected to have an operational range of 250 to 400 miles, and fly above 60,000 feet at speeds up to Mach 5. Although similar to the present *Bomarc* in appearance, the new missile will use a solid propellant motor. It virtually will have the same ground alerting and guidance system of the older version.—News item.

SAGE in Operation

The first electronic air-warning network known as SAGE (semiautomatic ground environment) system is now in operation. The complex system utilizes long- and medium-range radars linked by an automatic transmission system. The long-range radars are 50 feet in diameter and weigh over a ton. Some are mounted on strategically located ground sites, while others are on steel platforms as much as a hundred miles at sea. Medium-range radars are used to fill the gaps between long-range radars to assure complete coverage. These sets automatically transmit data by telephone lines to the control center where electronic computers receive the information and monitor the position of aircraft and defense weapons.—News item.

Ready Force

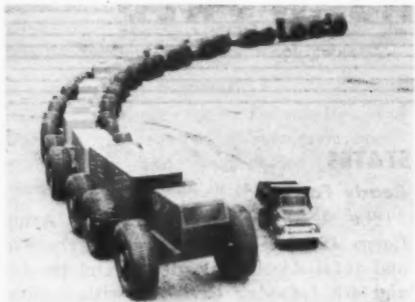
The United States Strategic Army Corps (STRAC) is composed of the 82d and 101st Airborne Divisions and the 1st and 4th Infantry Divisions with a total strength of over 125,000 men. Command facilities are provided by the XVIII Airborne Corps headquarters. STRAC has been described as that element of the Army which is maintained in the Continental United States to meet or reinforce any initial emergency requirements throughout the world. Mobility for STRAC forces is to be provided by the Navy and Air Force.—News item.

'Independence' Launched

The fourth of the *Forrestal* class carriers, the *Independence*, has been launched and is expected to be ready for fleet duty early in 1959. Like the *Saratoga* and *Ranger*, second and third of the *Forrestal* class carriers, the *Independence* is longer than the *Forrestal*. The big carrier is powered by four turbines capable of more than 250,000 horsepower, and will have a speed in excess of 30 knots. The *Independence* will carry 100 planes, including twin-jet bombers, and will be the last of the carriers to be armed with guns. Future carriers will have antiaircraft missiles as standard ordnance.—News item.

Trackless Train

Just off the design boards is a nuclear age trackless train suitable for use with power from either atomic reactors or conventional engines. Design of the cross-country conveyance system calls for a length of approximately 450 feet, with width and carrying capacity varying according to the needs of the user. The im-



Scale model of trackless train

proved transport device utilizes power for each of its 52 wheels. Complete steering controls at both ends and a new tracking arrangement make it reversible and maneuverable under practically all conditions. It has a highly simplified suspension system which provides smooth-riding characteristics, and utilizes the "electric wheel" system of propulsion (MR, Jun 1957, p 62).—News item.

'Hound Dog' Missile

The GAM-77 *Hound Dog* air-to-surface missile, according to published information, will use the airframe of the X-10, test vehicle for the SM-64 *Navaho* project (MR, Sep 1957, p 66) and also will have the guidance system developed for that project. *Hound Dog*, which will be launched from a wing mounting on the B-52G *Stratofortress*, will carry a nuclear warhead. In tests it has proved to have an extremely high degree of accuracy.—News item.

'Skipjack' Launched

The SS(N)-585 *Skipjack* is the first atomic-powered submarine to be designed with the revolutionary *Albacore* hull (MR, Mar 1957, p 66). The *Skipjack*, which displaces 2,850 tons (light), is driven by a single 15-foot-diameter propeller and has an officially listed speed of 20 knots. Features of the *Skipjack* include extreme maneuverability, an automatic pilot that can be set for course, speed, and depth, pushbutton control for filling or emptying ballast tanks, and a self-contained atmosphere that constantly is purified and recirculated. Two other atomic submarines, the *Seawolf* and *Skate*, have stayed submerged for 30 and 31 days respectively while traveling 8,000 miles in maneuvers with the Atlantic Fleet. The previous record of 16 days submerged was set by the *Seawolf* in 1957.—News item.

Paradrop Platform

An experimental, combat-expendable platform for parachute delivery of heavy equipment utilizes paper honeycomb as a shock absorber. The system permits heavy equipment to descend safely at rates up to 55 feet per second, the rapid descent



US Army Photograph

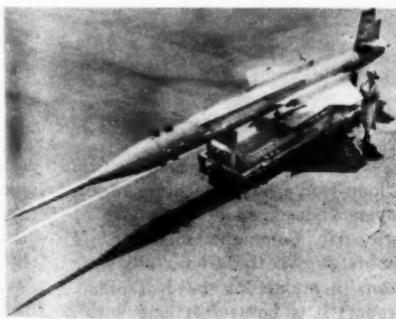
Jeep on paper honeycomb platform

giving greater accuracy in an airdrop. Material used costs only about one-tenth as much as the present system, and weighs only one-half as much. It can be fabricated on the spot to fit the individual items of equipment.

Also under test is a shockproof package for use in emergency drops without a parachute. The fiber case used is designed especially for dropping plasma, drugs, serums, food, and supplies during wartime emergencies and peacetime disasters. In one test low-flying airplanes dropped 15 of the special packages containing bottles of blood plasma with pinpoint accuracy and with contents in perfect condition.—News item.

New Model 'X-7'

A new model of the X-7 test vehicle for ramjet engines uses underwing boosters to permit ground—as well as air—launching, and incorporates an autopilot that responds to commands twice as quickly as the older version. It has advanced camera instrumentation to permit double the film coverage during a test flight, and will be used to test four new type ramjet engines now under development. Air launching of the improved X-7 will be



Latest version of the X-7

from the bomb bay of a specially modified B-50 bomber. Previous models of the X-7 were launched from beneath the wing of a B-29. Underwing rockets are used to boost the aircraft to supersonic speeds rather than the rear-mounted rocket unit used in earlier models.—News item.

'Mace' Guidance System

The TM-76 *Mace* is undergoing test with two different guidance systems, one an inertial system, the other called ATRAN. The inertial system gives the *Mace* complete invulnerability to enemy jamming. Since it does not use terrain check points the missile can be flown over any course including wide expanses of water. This system also emits no radiation of any type,



Mace in jet-assisted takeoff

making detection of the *Mace* considerably more difficult.

The ATRAN is a map matching system which divorces the *Mace* from need for ground control, and is almost impossible to jam. It relates a film strip, actual or synthetic, to the terrain over which the weapon is flying and adjusts the flight of the missile to conform to the film. It also permits the *Mace* to fly at low or variable altitudes, making radar detection more difficult.

The *Mace* is a ground-to-ground, jet-powered, 650 mile-an-hour tactical missile that is 44 feet long with a 23-foot wing-spread. The missile is equipped with a recovery device for training. It is brought to earth by three 100-foot cargo parachutes, the landing shock being absorbed by large air bags of rubberized fabric.—Commercial source.

'Mechanical Mule'

The Army's *Infantry Light-Weapons Carrier*, M274, better known as the *Mechanical Mule*, has proved itself to be outstanding as a weapon platform in addition to its many uses for transportation



US Army Photograph
Mechanical Mule is air transportable

purposes. The *Mule* weighs 830 pounds, can carry a 1,000-pound load, and is designed specifically to accompany riflemen at foot speed. Its speed ranges down to 0.8 miles an hour. It can be operated by a



US Army Photograph
Mule with 106-mm recoilless rifle

soldier riding on it or walking with it. Powered by an air-cooled four-cylinder engine, the *Mechanical Mule* has both four-wheel drive and four-wheel steering.—News item.

Radio Service

The million and a half members of the Armed Forces and their dependents overseas are provided with a daily major league baseball game broadcast live and direct from the ball park through the facilities of the Armed Forces radio worldwide shortwave service. Complete news reporting, music, and top-flight radio entertainment, as well as special events, complete the daily programing. The summer schedule of the AFRS shortwave program starts at 1730 Greenwich Meridian time and concludes at 2224.—News item.

'Goose' Missile Tested

The *SM-73 Goose* missile has conducted numerous successful test flights. The



Air-breathing SM-73 Goose missile

SM-73 has been described officially as a "long-range, air-breathing missile weapon system designed for support of Strategic Air Command missions." Unofficial sources give the *Goose* a weight of two tons, a maximum speed of Mach 1.3, and report it to be 31 feet long with a 13-foot wingspan.—News item.

Flight Operations Center

A highly mobile Flight Operations Center (FOC) to control Army aircraft in any combat area emphasizes the important defense role of Army Aviation—both fixed-wing aircraft and helicopters—for artillery fire control, observation, troop and material movement, rapid transport

of casualties, and other diversified missions. The nucleus of the center is a 30-foot operations van. Other vehicular units include a radio equipment shelter and two trailer-mounted diesel generators. All units can be air-lifted or ship-loaded. The control van is waterproof and can be floated ashore without a landing craft at a beachhead.

The FOC differs from conventional air control means in that it is designed to regulate Army aircraft en route between points rather than at landing and takeoff. Equipment in the van includes four radio sets for ground-to-air contact; two teletypewriters also are available. The van is supplied with heat and air conditioning



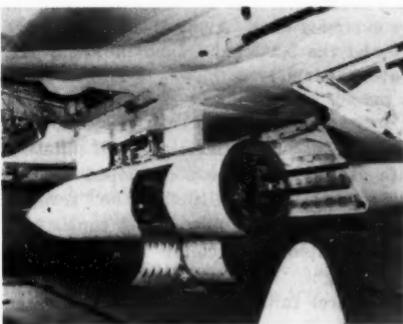
US Army Photograph
Interior of FOC van

so that men and equipment will be able to function from 60 degrees below zero to 140 above.—Official release.

External Gun Pod

The *A4-D Skyhawk*, smallest and lightest of operational United States jet aircraft, is so small that it was designed without the folding wings previously required for carrier-based aircraft. The tiny attack bomber is powered by a single *J-65* turbojet engine and can achieve a speed of nearly 700 miles an hour. In spite of

its small size the *Skyhawk* can carry nuclear weapons, rockets, or guided missiles, and is equipped with a special underwing gun pod containing a double-barreled 20-mm automatic cannon. The pod can be quickly attached by two simple connections, and can be instantly jettisoned by the pilot in flight. The twin-barreled gun is capable of firing 2,000 rounds per minute from each barrel. The design of the



Gun pod of the *Skyhawk*

cannon pod is said to permit a much greater flexibility in the tactical use of the aircraft. Also the new container makes it possible in emergency situations to convert any plane capable of carrying a 1,100-pound load (the weight of the pod) into a gun-firing tactical aircraft.—Commercial source.

Construction Halted

Construction of six new warships and the modernization of three other vessels has been dropped from the Navy's building program. New construction terminated includes four 50 million dollar guided missile frigates and two destroyer escorts. The modernization work called off includes the conversion of the aircraft carrier *Block Island* to a helicopter carrier, and the cruisers *Chicago* and *Fall River* which were to have become guided missile vessels.—News item.

Reorganization Progress

All active nondivisional artillery units have been redesignated as elements of 74 parent artillery regiments selected for perpetuity under the Combat Arms Regimental System. A total of 157 regiments of all types have been selected for retention, each to have at least one Active Army element. The two-year program, which began with the reorganization of the 101st Airborne Division in 1956, will be extended to the Army Reserve in Phase II and the National Guard in Phase III.—News item.

Trapped Air Life Jacket

A pocket-size, lightweight, self-inflating life preserver has been developed for use by combat troops. Utilizing the "trapped air" principle, the new jacket consists of an air-expandable collar attached to a lightweight, fixed-pad preserver. When the wearer falls into the water, the water pressure forces the trapped air up into the collar which is made of a light, punctureproof fabric. The jacket can be worn easily with combat equipment and components will not corrode in salt water.—News item.

Aerial Tramways

Two prototype self-powered cableway cars are under construction for use in cargo handling on the Army's ship-to-shore aerial tramway system. The self-propelled "skycars" will expedite the movement of cargo over a one-mile-long aerial cable. A five-ton payload is suspended under the cars which will travel at a rate of 25 miles an hour in a continuous movement from the water to the land end of the system. The aerial cable will be supported by 75-foot-high towers mounted on special barges. The system is designed for ship-to-shore operations where piers or other harbor facilities do not exist, or have been damaged.—News item.

Harbor Defense Tests

The midget submarine *Sprat* has been loaned to the United States Navy by Great Britain for use in testing harbor defenses. The *Sprat* displaces 35 tons and is 53 feet long. It carries a crew of five and will be manned by its British crew during the harbor defense tests.

The loan of the submarine is effected under the mutual cooperation scheme set up between the US and Britain during World War II. Other military information that has been exchanged under this mutually beneficial agreement concerns the angled deck for aircraft carriers, catapult launchers, the probe-and-drogue refueling system for jet aircraft, and anti-submarine weapons.—News item.

Space Power

A rocket motor under development is expected to generate from 500,000 to a million pounds of thrust and to be capable of launching a satellite weighing as much as 10 tons. Components of the engine are under test. Fuels to be used are liquid oxygen and kerosene.

An experimental atomic reactor has been completed for research in the use of nuclear power for rocket propulsion. Named *KIWI-A*, the reactor will receive initial tests late this year at the Nevada atomic proving grounds.—News item.

UNITED NATIONS

UNEF Cost

The United Nations expended a total of \$28,775,836 to maintain its Emergency Force in the Middle East during the first 14 months of the force's existence, November 1956 through December 1957. An authorization of up to 25 million dollars has been made for 1958, but estimates are that the actual cost will be 20.2 million dollars. The 5,400-man force is comprised of contingents of troops from Brazil, Canada, Colombia, Denmark, India, Norway, Sweden, and Yugoslavia.—News item.

USSR

Submarine-Launched Missiles

The *Comet II*, a medium-range ballistic missile propelled by a solid fuel rocket with a thrust of about 99,000 pounds, is completely waterproof for towing behind submarines, and is currently in production. A submarine tows three of these missiles and a launching cannister. The *Comet II* is launched by loading the missile into the cannister tube at sea; the rear of the cannister is then flooded to tilt the affair into a vertical position, where it is gyro-stabilized. The *Comet II* is said to use radio-inertial guidance.

A further development of this type of missile is the *Comet III* which will have a range of about 1,800 miles—almost three times the range of the *Comet II*. The *Comet III* is now under test and is expected to be completed in about 18 months.

Other missiles adaptable for submarine launching are the *J-1*, *J-2*, and *J-3* weapons (MR, Apr 1958, p 73), and the *Golem* series of experimental and test rockets. The *Golem 1* is obsolete; *Golem 2* was a test vehicle consisting of a liquid propelled rocket and a solid propellant booster with a range of about 1,250 miles; *Golem 3* used four solid propellant rockets for experiments in launching from extreme depths.—News item.

Versatile Aircraft

The *MiG-17 Fresco* has been produced in at least five different versions. *Fresco A* was the prototype version of the *MiG-17* and had its airbrakes mounted on the rear of the fuselage. *Fresco B* had airbrakes located forward near the trailing edge of the wing and was powered by a *VK-1* engine of 6,000 pounds thrust. *Fresco C* was similar to the *A* model, but featured an afterburner, which gave its *VK-1A* engine a thrust of 6,900 pounds, and wing-tanks which gave it a range of operation of 1,150 miles. *Fresco D* is a radar-equipped, all-weather fighter with air-

brakes located at the rear of the fuselage. *Fresco E* is the same as the *D* model but equipped with afterburner for additional thrust.—News item.

Withdrawal of Troops

It has been announced that Soviet troops are to be withdrawn from Romania soon, and that an additional division of Soviet troops will be withdrawn from Hungary during 1958. The number of Soviet soldiers in Romania has been estimated at 30,000 to 40,000. The reduction of force in Hungary is said to be in addition to the cut of 17,000 troops announced previously (MR, Jun 1958, p 76). Other east European nations have announced plans to reduce their armed forces by a total of 119,000 men during 1958. The reductions are as follows: Romania, 55,000; Bulgaria, 23,000; Poland, 20,000; Czechoslovakia, 20,000; and Albania, 1,000.—News item.

MALAYA

War Tally

The 10-year battle of the Malayan Government against the Communist rebels has resulted in 6,565 Communists killed, 2,796 wounded, and 1,266 captured, in addition to 2,112 who have surrendered voluntarily. Government losses have been 4,324 killed and 2,923 wounded. More than 1,000 Communists are still fighting the government, as compared to an estimated 11,500 in the rebel forces at the start of the war.—News item.

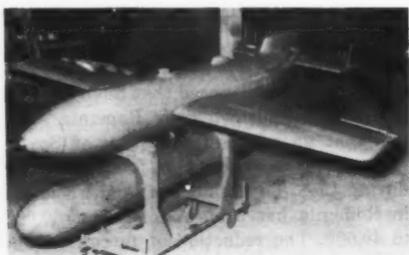
FRANCE

Plutonium Production

France's giant Marcoule atomic reactor has been producing plutonium at a rate of about 1.3 ounces per day for several months, and the stock of the precious metal now on hand is said to be about 22 to 26 pounds. Two other reactors are in the process of construction at the same location and will be functioning this year.—News item.

ARGENTINA

Locally Produced Rockets



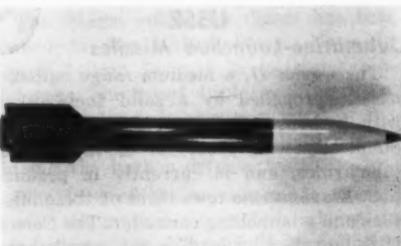
Guided missile PAT-1

The *PAT-1* is an electronically guided missile designed to be launched from aircraft against ground and naval targets. It has a range of slightly over nine miles and weighs about a ton. It is powered by a liquid propellant rocket motor and attains a maximum speed of 560 miles an hour.



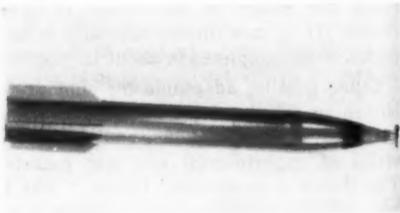
Three-rocket launcher

This experimental launcher utilizes spiral rails to impart a spin of 700 revolutions a minute to the rocket as it is launched. It has a maximum elevation of 50 degrees and an on-carriage lateral adjustment of 20 degrees. Its spiral rails are only 55 inches long and the launcher itself weighs less than 200 pounds.



Artillery rocket A3F

This four-foot-long, ground-to-ground rocket is planned for artillery use, but it also can be launched by ground attack aircraft. It carries a shaped charge or high-explosive warhead and has a range of 5.6 miles.



Aviation rocket A3H

For use by ground attack aircraft in close-in support, this weapon is 40 inches long and weighs 50 pounds.



Aviation rocket A4M

The *A4M* is 28 inches long and weighs slightly less than 10 pounds. It is designed for air-to-air use, but also can be used against ground targets.—Official release.

WEST GERMANY

Air Defense System

According to a West German news report France, Belgium, and the Netherlands will join West Germany in the establishment of 10 antiaircraft rocket battalions as part of the joint European air defense system. The units will be equipped with US *Nike Hercules* rockets and will reinforce American and British air defense units already set up in West Germany. The West German forces will man three of the emplacements, each battalion comprising 800 to 900 men in four operational batteries. The first contingent of 550 men for these units currently is undergoing a two-year training course in the United States, according to the report. The air element of the West German air defense contribution will operate Canadian *Sabre Mk. 6* interceptors for medium altitudes and about 150 special high-altitude interceptors.—News item.

Addition to Navy

The United States destroyer *Anthony* has been transferred to the growing West German Navy, and designated Z-1 (*Zerstörer Eins* or Destroyer One) in keeping with the German tradition of numbering destroyers and torpedo boats. The 2,750-ton Z-1 as originally armed had five 5-inch, six 40-mm, and ten 20-mm guns; five 21-inch torpedo tubes, and depth charge equipment. It is capable of a speed of more than 30 knots. Twelve new destroyers to be constructed for the German Navy will displace 2,800 tons and have a speed of about 34 knots. Three of these vessels are under construction.—News item.

Armed Forces Remodeled

The West German Army is to be designed for combat under modern conditions according to a German Defense Ministry announcement. The new combat formation will be patterned after but not

identical to the United States Pentomic division. The basic unit will be a completely motorized brigade of 3,000 to 4,000 men fully outfitted with conventional weapons and capable of living on its own resources for a number of days in combat. The brigades will be tank or armored infantry, and a division will consist of three or four brigades, depending upon the divisional mission. The reorganization, to receive its initial test in the 1958 fall maneuvers, will not be complete until 1963 according to present plans. In the realignment of force the present battalion of about 900 men will be reduced to approximately 600 with a corresponding increase in rear area support units. The over-all goal of 12 divisions and a force of 250,000 men will not be affected by the reorganization. Present strength of the West German forces is 155,000, of which all but 37,000 are volunteers.—News item.

JAPAN

Nuclear Vessels Planned

Nuclear-powered passenger vessels, surface oil tankers, and submarine tankers are being designed by Japanese shipbuilding firms. Among the vessels under consideration are atomic-powered passenger ships of 10,000-ton displacement with a cruising speed of 26 knots, and a 30,000-ton submersible tanker with an underwater cruising speed of about 23 knots.—News item.

ITALY

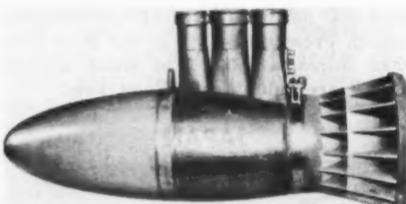
Tactical Aircraft Accepted

The *G 91* (MR, May 1958, p 69), recently under test by the NATO forces, has been recommended for adoption for use in operational NATO squadrons by the committee supervising the tests. The *G 91* has been fitted with French-made *5103* missiles (MR, Dec 1957, p 70) which were designed originally as air-to-air weapons but used by the *G 91* in ground-attack trials.—News item.

GREAT BRITAIN

Transition Flight

The *Rotodyne* VTOL transport aircraft (MR, Feb 1958, p 70) now is well advanced in its flight development program. First tested in November 1957, the revolutionary *Rotodyne* has successfully accomplished transition from helicopter to autogyro operation in straight flight without loss of altitude. A speed of 150 miles an hour has been reached by the prototype under test, and production models of the aircraft are expected to have a top speed of 185 miles an hour and a maximum range of 450 statute miles. The four rotor tip-jet engines, each of 1,000 pounds



Tip-jet unit with silencer

thrust, will give the big aircraft a vertical rate of climb of over 1,500 feet per minute. The difficult problem of reducing the noise of the jet units is under study. Noise suppression nozzles for the four tip-jets are being tested.—Commercial release.

Funding Agreement

Agreement has been reached between Great Britain and the West German Government concerning the payment of direct support costs for British forces stationed in Germany. Under the agreement, which has been previously in force, the West German Government provided Deutsche mark funding in the amount of 140 million dollars for 1957, and about 131 million dollars for 1958. (This represents only a fraction of the total cost of the forces concerned.)

Under the new agreement West Germany will pay support costs of 33.6 million dollars for each of the next three years, and place orders for 140 million dollars worth of arms with the British Government. The West German Government also has agreed to repay 63 million dollars of postwar debts during 1958-59 that would otherwise have been paid during 1962-64.

Britain will keep the British Army of the Rhine at its present strength of 55,000 men until the end of 1958, and during the time of the agreement will maintain a strength of at least 45,000 in West Germany. The British Second Tactical Air Force in Germany will be kept at its present strength until the end of Fiscal Year 1960-61.—News item.

Outmoded Carriers

Four aircraft carriers of the *Colossus* class and two aircraft maintenance carriers are to be disposed of as outmoded. The carriers concerned—the *Unicorn*, *Warrior*, *Perseus*, *Theseus*, *Ocean*, and *Glory*—are all of World War II construction. Three others of the *Colossus* class carriers have been sold. They include the *Venerable*, sold to the Netherlands in 1948 and renamed *Karel Doorman* (MR, Jul 1957, p 69); the *Colossus*, sold to France in 1951 and renamed *Arromanches* (MR, Oct 1957, p 69); and the *Vengeance*, sold to Brazil in 1956 and renamed *Minas Gerais* (MR, Mar 1957, p 68).—News item.

CANADA

Training Ship Deactivated

The *HMCS Ontario*, a light cruiser that has been used as a cadet training ship, is to be deactivated. The *Ontario*, a sister ship of the British Navy's *Swiftsure*, was built by Great Britain during World War II and presented to the Canadian Navy upon completion.—News item.

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FOREIGN MILITARY DIGESTS

The Military Defense of the West

Digested by the MILITARY REVIEW from an article by Ernst Bieri in "Swiss Review of World Affairs" January 1958.

IN A volume published in Zurich, entitled *Besinnung und Hoffnung*, Daniel Villey, a Frenchman, writes:

There is a kind of prudishness that often prevents us from looking military problems straight in the eye, and from speaking soberly of the defense of Europe and its rights and freedom. Yet the threat facing us is concrete, present and lasting. Not to be concerned about it would mean to take leave of life, and for our people to be indifferent to their own fate, as long as Europe remains divided, its security depends completely on the American guarantee (of its survival), about which there is reason to fear that it is not altogether reliable. No one will in the long run defend someone who does not defend himself.

With these words Mr. Villey has touched one of the most burning problems of Europe's present and future. There is ground for great reassurance in the fact that European public opinion is becoming increasingly aware of the situation as he describes it. It is being realized today on the old

continent that the containment of Soviet dynamism in the past 10 years has been owed to the United States—to be exact, to the atomic shield provided by the United States.

After the coup of Prague, Moscow tried to destroy the outpost of Berlin by means of the blockade, but had to abandon this attempt because it justly feared the American atom bomb. Stalin's "hard" policy, for the rest, has brought Russia few advantages in Europe, apart from the fact that it enabled her to consolidate conquests of the war and postwar period.

The provocative policy of the Soviets and their aggressive language led to a collaboration of the free European nations with the United States, the most important manifestation of which is NATO. Without the continuous pressure brought to bear on Europe by the Soviets, and their intransigent attitude reasserted time and again in all decisive points, neither the Atlantic community nor European integration would have taken concrete form.

The Soviets Catch Up

Until recently the basic assumption of the policy of the free world has been the strategic superiority of the United States over the Soviet Union. However, a bad blow has been dealt the strategic superiority of the United States. The Soviet Union now is in possession not only of the A- and the H-bomb, but also has embarked on the production of atomic weapons. A balance has been achieved with respect to such weapons—Russia has caught up with America.

The United States, on the other hand, retains a considerable advantage with regard to another, equally important element of strategy—her geographical position. She has a large number of advanced bases laid more or less in a circle about the Soviet Union. The Soviet Union thus is pushed back upon the interior lines and must leave the rule of the seas, which is extremely important in the global alignment, to the West.

The development of the techniques of warfare now makes it possible for the Soviet Union to beat the United States even in this advantage of geographical position. Intercontinental ballistic missiles will not, of course, cancel the value of the advanced bases of the Americans. But they allow the Soviet Union to transport nuclear weapons to the United States without having to establish advanced bases or acquire control of the seas. The long-range rockets with their explosive charges can be launched either from Soviet territory or from submarines.

Balance of Terror

Only the combination of both factors—the production of atomic weapons on one hand, and the introduction of long-range carriers for these, on the other—represents the real strategic balance of the two world powers. The Soviet Union, to be sure, cannot abolish the tremendous power of reprisal of the United States, which today basically rests on the Strategic Air

Command and the possession of bases around the periphery of the Soviet Union. But she is able to throw the same terrible threat into the balance.

For the first time in history it is possible to bombard the American mainland with powerful weapons without having first established control of the seas, the air, and the coastlines. Whether this condition is realized, or whether the Russians will not actually have efficient intercontinental ballistic missiles until a few years from now, is unimportant. The time will come when a missile equipped with an H-bomb can be transported from the territory of the Soviet Union to the territory of the United States within 30 or 40 minutes without any advance notice.

And Europe?

The strategic balance between the Soviet Union and the United States has the inevitable consequence that the American atomic shield no longer can work as the only or even the primary protection of free Europe. In any event, it is not to be expected that the President of the United States will automatically order the Strategic Air Command to use atomic weapons when a conflict breaks out somewhere in Europe. In the perspective of global strategy, Europe has dropped to the level of a Korea—it will not be abandoned without a struggle, but neither will the ultimate weapons be used in its behalf.

The weakening of the American atomic protective shield has nothing to do with a turning away of America from Europe; it simply is the consequence of Soviet progress. One must learn to understand in Europe that the American people hesitate to use their most powerful weapon on behalf of a possibly limited European conflict, if there is the risk of an immediate Soviet reprisal in the form of A- and H-bombs dropped on American cities.

What are the consequences that result for Europe from the strategic balance of the two world powers? First, Europe can

no longer take refuge exclusively behind the American atomic shield. Second, it must fill the political vacuum which it has allowed to arise in the reliance on the effectiveness of American deterrent power in nonglobal conflicts. Third, Europe must continue to consolidate its alliance with the United States in order to be sure of the complete solidarity of the United States, including the use of strategic power, if matters should become worse.

Europe must learn to defend itself. Practically speaking, therefore, Europe's way means the maintenance of NATO and, within the framework of this defensive alliance, a massive effort to eliminate a deplorable military inferiority on the tactical level. Since the Soviet Union has caught up with the West in strategic respects, the European and other countries have no choice but to remedy the backwardness of their tactical armed forces as quickly as they can.

Appeals

The effect of the strategic "pat" has been studied closely by the Western leaders. The past year witnessed a plethora of publications and speeches that aimed at enlightening public opinion on the true nature of the situation. Among the political leaders who voiced concern over the casualness of European nations which prefer their social security systems to defensive preparedness is the editor in chief of the *Neue Zürcher Zeitung* (Willy Bretscher).

Last August Mr. Bretscher delivered a lecture to a Congress of Liberals at Oxford which attracted much attention and in which he called for an energetic effort on the part of Europe to strengthen its conventional armaments.

Mr. Bretscher belongs to that fortunately growing circle of Europeans who cannot bear the thought of Europe's being defended in the future mostly by American, Canadian, and, perhaps, British troops. It is not a coincidence that a Swiss

poses this issue. Although Switzerland is neutral in foreign political and military affairs, every citizen of this small country knows that this neutrality must be *armed*.

In Switzerland people find it hard to understand that entire nations believe military defense is superfluous or to be kept at a minimum. In truth, the democratic way of life with all its social and human values is threatened with ruin if the peoples are not prepared to protect it against threats from the outside.

The problem is not insoluble. Europe's potential in manpower, raw materials, communications, and talent is large enough to create an effective balance with the potential of the Soviet Union, even without the direct aid of the United States. The task consists in activating this potential—the insight and the will of the nations and their leaders at last to tackle the job of their self-defense wholeheartedly.

Global Planning

The inauguration of remote-controlled and ballistic rockets, together with the production of a variety of atomic weapons, from the small A-bomb to the massive H-bomb, not only changes global strategy fundamentally, but also revolutionizes the organization, development, and effectiveness of ground forces. The great concern of the infantry—the enemy plane—is replaced by the still greater concern of sudden atomic bombardment. The European Continent no longer is in the center of military (if perhaps still of political) strategy. Planning now runs on a global scale. Thrusts through Northern Europe, the Mediterranean, to North Africa, or Southeast Asia seem more probable today and more promising to an aggressor than a gradual advance on land.

Europe's chances of preventing or holding up a frontal attack from the east doubtless are real. In part, these chances rest on the assumption that a strategic thrust no longer would be directed pri-

marily upon the channel. Beside strengthening its own defenses, Europe does not overlook the other possible theaters of operation from which it also might be attacked and defeated. Participation in an alliance such as NATO is designed to counteract European particularism and to

make the peoples aware of the global scale of the community of fate or freedom. A Europe prepared and capable in military respects must feel itself as part of the entire free world, just as the United States is expected to abide by her commitments and obligations.

Missiles or Supersonic Bombers?

Digested by the MILITARY REVIEW from a copyrighted article by Air Marshal Sir Robert Saundby in "The Aeroplane" (Great Britain) 20 September 1957.

THE decision, announced last spring in the White Paper, *Defense: Outline of Future Policy*, not to proceed with the development of a supersonic manned bomber to replace the *Vulcan* and *Victor*, and a supersonic manned fighter to replace the English Electric *P.1*, is meeting with growing opposition.

The main objection to this decision is that it is based on a superficial review of the situation, and is relying on the development of guided and ballistic missiles as being the simplest and cheapest way out of our difficulties. This policy is condemned as a dangerous gamble because it does not take into account sufficiently the vast range of complex problems which must be solved before we can hope to have an operational missile system reliable enough to replace our manned bombers and fighters.

Any serious unforeseen delay in the development of the rocket missiles would leave us, for a time at least, practically defenseless. It is pointed out that the Americans, after devoting immense resources and effort to these projects—they have over 70,000 people working on them, with almost unlimited financial backing—still have not produced a reliable long-range ballistic missile.

It is, therefore, urged that, as an insurance against this risk, the development of these two supersonic types should be resumed.

In addition, two further arguments are put forward in support of this policy. The first stresses the importance of military research programs in their application to civil aircraft. It is claimed that in this country and in the United States practically all progress in the design of civil aircraft has depended directly on basic military research undertaken for the purpose of defense. We cannot hope that the aircraft industry could find the money and resources to undertake, on its own, research and development on the necessary scale. Nor are these critics reassured by the government's statement that a study of supersonic manned aircraft is to be put in hand. It is urged that much more than a study is required. Lord Tedder went so far as to say that he believed that no British supersonic manned bomber meant, quite literally, no British supersonic civil aircraft.

Secondly, it is contended that every major industry in the country is indirectly but deeply indebted to the fruits of basic military research. Such things as improved metal alloys and chemical products, especially plastics and other new materials and adhesives, are examples, but the most striking is the extremely rapid growth of electronics. Electronic computing machines and controls for automatic processes—in fact, the entire business of automation, about which we hear so much—would not

have been available, and we would have had to wait many years for them had it not been for their development as urgent defense requirements.

There is much force in all these arguments, but unfortunately we are faced with the basic fact that we do not have, in this country, the scientific and technological manpower or the research facilities needed to pursue simultaneously, with any hope of success, the development of supersonic manned bombers and fighters and a reliable system of guided and ballistic missiles. To those who question this the answer surely is that the main—almost the sole—reason for our long series of failures over the past 10 years is to be found in our policy of spreading our limited resources over too many major projects. To attempt to back it both ways—to develop simultaneously the supersonic aircraft and the missiles which will replace them—would be to invite the probability, almost the certainty, that we would fail to produce either by the time it was wanted.

If, therefore, we must choose between these two projects, which should we go for?

The Choice

There are those who say that we have already lost the race for the development of guided and ballistic missiles. They believe that the Americans and Russians are so far ahead of us that we have no chance of catching up with them. They advocate that we should rely on the United States for missiles and concentrate on the production of a new generation of supersonic manned aircraft. They claim that by adopting this policy we should be undertaking a task that is within our capacity, that we should avoid a dangerous gap in our defenses if the development of the rocket missiles were delayed, and that we should be providing the essential basic research on which the design of our future supersonic civil aircraft will depend.

This is certainly a feasible proposition

which should not overstrain our resources, but it has two grave weaknesses. Reliance on the United States for rocket missiles must make us partially, and if continued for too long wholly, dependent on American good will for our possession of the master weapons of defense. Such dependence on the United States would mean, in practice, that we must adjust our foreign policy to agree with that of the State Department. We could never do that, in view of the wide differences between United



US Air Force Photograph

The Snark was the first US intercontinental surface-to-surface missile to be tested

States and British foreign policies arising out of American anticolonialism and commercial competition with this country, unless we were prepared to sacrifice all that is left of our Empire and with it much of our high standard of living.

It is true that, at present, we have a makeshift arrangement by which the United States will make available to us a number of medium-range missiles, but they are prevented by law from letting us have the essential nuclear warheads without which the weapons are useless. In time we can produce our own warheads to fit these missiles, but even then the position will be far from satisfactory. It is easy to foresee the outcry in the United States if we were to use these weapons for any purpose of which the Americans might disapprove. In this connection it is inter-

esting to note that the United States did not find it possible to support us in the Security Council recently, even in so plain and straightforward a case as the recent disturbances in Oman, where, as required by our treaty of friendship, we assisted the Sultan of Muscat and Oman to deal with a rebellious imam who was armed, financed, and encouraged by Saudi Arabia, and to restore order in his own territory.

Defense Against the Missiles

However, the really fatal weakness of this proposition is that it assumes that supersonic manned aircraft, when we have produced them, would be capable of meeting our defense needs. We could not hope to have these aircraft in service in less than eight years, and it would probably be 10 or more before they were available in quantity. By that time they would be obsolete.

Whatever we may think of the recent Russian claim to have tested successfully a multistage rocket missile, capable of carrying a nuclear warhead, with intercontinental range, it is certain that the time is not far off when both the Russians and the Americans will have nuclear rocket weapons with a range of 2,000 miles or more. Of what use will a supersonic manned fighter be in defense against such weapons? And will a supersonic manned bomber, operating from a known airfield with runways of enormous length, be able to carry out its task successfully against an effective missile system?

It is clear that its bases will be highly susceptible to long-range missile attack, and that the bomber itself, being vulnerable to ground-to-air guided or homing missiles, cannot have the same power of penetration of enemy defenses as would a rocket missile. The sole advantage of this policy would be the assistance that it would give to the designers of supersonic civil aircraft, but it seems illogical to the verge of insanity for a country to handicap itself with an out-of-date de-

fense system in order to benefit its civil air transport.

The only other possibility is to drop the development of supersonic military manned aircraft and concentrate mainly on the long-range rocket missile. If this policy is to be successful it must aim at producing, as soon as possible, not counterparts of the American *Thor* and other medium-range missiles, but the second generation, as one might term it, of rocket missiles—the multistage rocket carrying a nuclear warhead to a range of 5,000 miles with the greatest possible degree of accuracy. No one can doubt that this is a formidable task needing a great concentration of effort and resources. But by shedding other loads and really concentrating upon it, we ought to be able to produce it within five years. It is the ultimate weapon, and at this stage one cannot foresee any further steps in the development of offensive power. When this weapon has been perfected, research and development probably will be devoted mainly to the discovery of some means of defense against it.

As I have said before, I believe that the British excel when they are given a target to reach within a fixed time limit, however great the difficulties may be. Once we have made up our minds to do something, and are convinced that it is vital to our security and have overcome most of the obstructions from the Treasury, we do it.

The Drawbacks

The disadvantages of this course of action are dependence for a period on the United States for the supply of medium-range rocket missiles, and the effect that it would have on the production of supersonic civil aircraft and thus on our power to complete successfully in the increasingly important civil air transport.

With regard to the first of these drawbacks, we are dependent now on the United States for these weapons, and the production of a supersonic manned bomber in

eight to 10 years' time would do nothing to relieve that situation. Indeed, the diversion of effort to such a project would be likely to prolong the period of our dependence which can come to an end only when we have produced an operationally effective intercontinental ballistic missile of our own.

With regard to the second point it would surely be reasonable in these circumstances for the government—in consultation with the nationalized corporations, the private sector of civil air transport, and the aircraft industry—to issue agreed requirements for supersonic civil airliners. The necessary research and development and the building of prototypes should be financed by the government in the same way as for military aircraft today, but this project should not be given priorities which could interfere with our long-range rocket development program. It is wrong to burden the defense budget with things that are not, properly speaking, defense requirements, thereby giving a concealed subsidy to all kinds of civilian undertakings. If it is necessary for us to have supersonic civil air transports—and I believe that it is—the cost of their development should be borne by the Ministry of Transport and Civil Aviation and not allowed to inflate our defense expenditure.

While it is true that all major industries, including those manufacturing for export, indirectly derive great benefits from the results of basic military research, a decision not to build supersonic manned military aircraft could hardly affect the position. There is no suggestion, as far as I know, that the total volume of research for military purposes should be drastically cut down. On the contrary, the numerous problems associated with the production of long-range ballistic and shorter-range guided rocket missiles, and the possibilities of defense against these weapons, will require an immense amount of research.

One further objection is often raised to the policy of relying on nuclear weapons, carried by long-range rockets, as our primary means of defense. It is concerned with the limitations inherent in the use of these powerful weapons which are only now beginning to be realized fully.

The Deterrent Rocket

The attraction of the long-range rocket weapon as a deterrent lies, somewhat paradoxically, in the fact that there is no known defense against it. It will not be



The Victor, last of the V bombers, probably will see service for many years to come

possible, as it might be at present, for an aggressor to knock out by a sudden, well-planned surprise attack the victim's power of retaliation, or at least cripple it so severely as to obtain a decisive advantage in a war of nuclear destruction. A long-range missile system can be made largely immune from attack, and the weapon, once fired, cannot be intercepted and destroyed. Therefore, it is capable of immediate retaliation on a scale sufficient to ensure the destruction of the aggressor. So far, therefore, from the deterrent vanishing when this stage is reached, it will be more potent than ever. This is because an aggressor will know that, while he may be able to destroy his victim, his own destruction will be no less complete and inevitable.

But it is true that the long-range rocket missile is unlikely, within the foreseeable

future, to be sufficiently accurate to permit military targets to be economically destroyed by a weapon carrying a comparatively small warhead. Since accuracy is a function of the range in all ballistic weapons, the degree of accuracy to be expected at intercontinental ranges will favor the use of megaton warheads aimed at the largest possible targets. Any lingering traces of the conception of the military target, destroyed with the minimum damage to its surroundings, will vanish from global war.

There will be no practical alternative to the choice of the largest targets; capital and other great cities, and vast industrial complexes, such as the Ruhr or the group of steel-making towns on the Great Lakes in North America, must be the aiming points of intercontinental ballistic missiles. Therefore, the destruction and loss of life in a future global war will be unimaginably great; the immense power and indifferent accuracy of these weapons will prevent any attempt to avoid a catastrophe on such a scale that a new word will have to be invented to do justice to it.

The very awfulness of global war means that it is very unlikely to occur. Even the most unstable and megalomaniac, totalitarian ruler will shrink from plunging half the world, including his own country, into irretrievable ruin and the craziest of dictators has colleagues of varying degrees of sanity who will exert a restraining influence.

In reality, we have little to fear from the nuclear weapon as long as both East and West have in immediate readiness the power to destroy each other. We would have infinitely more to fear if the nuclear weapon were abolished, for then nothing could prevent the vast Communist land forces from overrunning the free nations of Europe, Asia, and Australasia, and bringing the entire continent of Africa under Communist domination. Isolated and hopelessly inferior to manpower and re-

sources, the fall of the United States would only be a matter of time.

However, it is contended that undue reliance on the long-range nuclear rocket will face us with the alternatives of being unable to check limited aggressions, the cumulative effect of which might well be disastrous, or of turning any minor aggression into a thermonuclear holocaust.

It is, of course, true that the long-range nuclear rocket cannot be expected to meet all our defense requirements. It is the only deterrent to global war which no amount



The *Vulcan* is in squadron service. A supersonic successor has been canceled in favor of long-range ballistic missiles.

of land or seapower could prevent, and as such is of the very highest importance. But we must have the means of repelling minor aggressions by the use of conventional forces, probably assisted in the future by small "clean" nuclear weapons. It would be foolish, indeed, to deprive ourselves of the means of fighting limited wars, and manned aircraft with conventional weapons will be needed for these tasks.

"Old-Fashioned" Aircraft

The recent operations in Oman suggest that there is a case for equipping a few squadrons with thoroughly slow, old-fashioned aircraft with piston engines. Such aircraft would be cheap compared to *Venoms* or *Shackletons* or their successors, and would be capable, by means of

rockets and suitable bombs, of doing all that is needed in operations of this type. In many ways they would be more useful and easier to handle than heavier, faster aircraft. And what a relief it would be to be able to buy aircraft costing only a few thousand pounds apiece, easy to maintain, and capable of using airfields of modest size unequipped with concrete runways.

I put this idea forward in all seriousness and believe that the time is coming when we need no longer assume that the successor of each type of military aircraft automatically must be required to fly

faster and higher than its predecessor, and carry a heavier load. The airplane cannot compete with the rocket missile in velocity, altitude, and striking power, and it no longer needs to attempt to do so. There are many roles for which military aircraft, freed from the responsibility of carrying out the long-range bomber and interceptor fighter tasks, will still be required, and they can in the future be specially adapted to these roles.

When we are considering these requirements we should not forget the old-fashioned virtues of simplicity, lightness, cheapness, and versatility.

Soviet Seapower Inshore Naval Forces

Digested by the MILITARY REVIEW from a copyrighted article by
J. Meister in "The Navy" (Great Britain) August 1957.

WHILE the results obtained by cruisers, destroyers, and submarines in past wars were rather disappointing, the Russian inshore naval forces—gunboats, minesweepers, motor gunboats, motor torpedo boats, and patrol launches—often fought very stubbornly and obtained some honorable successes.

These inshore squadron actions almost always were combined with mine warfare, coastal artillery, and, during the two World Wars, with the naval air force. Most of the fighting took place within the covering range of Russian coastal batteries and minefields, and only seldom were offensive sweeps undertaken by light Russian naval forces.

During the Crimean War the British Ambassador to Russia estimated that the Soviets might have as many as 180 gunboats in the Baltic. Owing to the lack of such vessels in the British and French Navies, the allied powers were unable to blockade the Russian coasts effectively al-

though the Russian Navy remained completely inactive. In the Black Sea, however, allied naval and land elements forced the entrance to the Sea of Azov, and 14 small British and four French warships destroyed over 500 Russian merchant ships, huge amounts of food and supplies, 340 guns, and 14 warships within a few weeks.

During the war of 1877-78 the first Russian torpedo boats were somewhat more successful and active against a superior Turkish Fleet. One Turkish monitor and one gunboat were destroyed on the Danube, and one battleship and one frigate were attacked off the Caucasian coast by Russian torpedo boats, the latter by the first Whitehead torpedoes.

During the defense of Port Arthur, gunboats and torpedo vessels shelled the seaward flank of the advancing Japanese troops several times and successfully defended the entrance to the port against repeated Japanese blocking attempts. The

last surviving vessels, including the battleship *Sevastopol*, fought off attacks by Japanese torpedo boats for six nights before being scuttled prior to the capitulation of the doomed fortress.

World War I

The First World War saw the tenacious defense of the entrance to the Gulf of Riga against superior German naval forces. In August 1915 two German battleships, four cruisers, and 33 torpedo boats, supported by many minesweepers and auxiliaries, forced the Russian mine and coast artillery defenses in the Irben Strait. Of the 20 Russian torpedo boats, four gunboats, one old battleship, and minesweepers in the gulf, only two gunboats and the battleship *Sslerava* were available to repulse the first German attack.

After a few days and considerable losses due to Russian mines, the German vessels broke through and two battleships, in a sharp night action in the Gulf of Riga, destroyed the Russian gunboat *Ssivoutch*. Afterward, when two British and five Russian submarines appeared, the Germans evacuated the gulf. German naval forces reentered the gulf after the outbreak of the Russian revolution; this time the Russian ships did not show much fight, and soon retreated.

During the civil war and against the allied intervention, the Soviets proved their ability to create and use local naval flotillas of miscellaneous ships. Although British motor torpedo boats made several successful raids against Kronstadt, on the Dvina River, and even in the Caspian Sea, some of the modern warships in the hands of the Reds survived—in very poor condition but still preserved for the future.

In addition to the flotillas on the Danube and the rivers of western Russia a Dnepr Flotilla operated against Poland in 1920. Many gunboats also were commissioned on Lakes Ladoga, Onega, Peipus, and Baikal, and most of the Russian rivers.

The Amun Flotilla played an important

role during the armed Soviet intervention against Chinese troops in Manchuria in 1929, and during the violent clashes between Japanese and Russian troops in 1938-40 on the Amun River and Lake Chanka. Soviet vessels seem generally to have been on top in these fights.

World War II

The real test came during World War II. When the Germans were unable to capture Leningrad in 1941—and the Soviet heavy naval forces were sunk, damaged, or just idle—converted gunboats, minesweepers, armed launches, motor gunboats, and motor torpedo boats defended the sealanes between Leningrad, Kronstadt, and the islands as far as Lavansaari. While the Soviet Navy had been unable to protect the Gulf of Riga and the Baltic islands, it was in a position to assure the supply of the outlying island garrisons and the Oranienbaum Cauldron. This was accomplished in spite of the fact that German and Finnish minelayers and motor torpedo boats often visited these Soviet-controlled waters.

In the Black Sea in 1941-42 the Germans had little difficulty in annihilating the Soviet coastal forces off Nikolaev, Sevastopol, and in the Sea of Azov; but because the German Army could not conquer the Caucasus, many Russian small craft there remained afloat.

From 1944 on, Soviet motor torpedo boats, which had so far scored only very few hits, obtained better results, including a few German minesweepers and one destroyer sunk. They attacked mostly with much dash and courage, but always without tactical skill. The small Soviet motor torpedo boats had gasoline engines and caught fire easily; still, the Germans were surprised to find these not-very-seaworthy craft operating off the north Norwegian coast, far from their bases.

The best designed of all small Soviet naval weapons was the flat-bottom armored motor gunboat with turrets from

army tanks and notable speed. The Germans had nothing to oppose it, and their lightly armed minesweeping launches and other coastal craft seldom sank any of these Russian vessels. Former Russian dredgers, armed with 5.1-inch guns, were used as gunboats, supported by the excellent minesweepers of the *Fugas* type which were equipped with 3.9-inch guns.

Nevertheless, the Russians limited themselves to the defense of their own coastal waters—not showing much enterprise or taste for offensive action. On a few occasions, such as during the reconquest of the Sea of Azov in 1943 and of the island of Oesel in 1944, Soviet gunboats shelled the German Army's seaward flank, but without much success.

Naval flotillas on every Russian lake and river reached by the Germans fought to the bitter end, and during the entire war the Soviets were able to hold part of the shores of Lake Onega and Lake Ilmen. The Caspian Flotilla convoyed the important oil from Baku to Astrakhan; the Volga Flotilla supported the defense of Stalingrad.

Lake Ladoga

The most important theater in the naval war might have been Lake Ladoga. Leningrad was beleaguered by the Germans and Finns, and the only way the fortress could receive food, fuel, and supplies was by ship over Lake Ladoga. During the winter trucks and trains traveled over the thick ice. In the summer of 1942 the Axis Powers decided to stop this traffic and to make the blockade tight. Without supplies, Leningrad was bound to fall within a short time; its fall also meant the collapse of the Soviet front from Murmansk to Lake Ilmen and the destruction of the rest of the Baltic Fleet, and it might have changed the outcome of the war in the east.

The very weak Finnish naval forces were strengthened by four Italian motor torpedo boats, four German minelaying launches, and about 20 gunlighters,

manned by German Air Force personnel. But while the Axis forces were not suited for the task, suffered many mechanical breakdowns, and generally were ineffective, the Soviets surprisingly showed much initiative and even tactical ability, repulsed some German and Italian attacks, and kept the lifeline to Leningrad open. On Lake Ladoga the Soviet Navy definitely had the upper hand, and their heavily armed gunboats and motor gunboats remained masters of this vital lake.

Of all classes of Soviet surface vessels, the motor torpedo boats were by far the most successful. Together with the gunboats, motor gunboats, minesweepers, and patrol launches they did almost all the work the Soviet Navy carried out during the Second World War, while the heavier ships provided fat targets for German aircraft and mines. However, the influence of the Soviet coastal forces remained almost exclusively defensive and restricted to zones very near the shores controlled by the Soviet Army.

Russian small vessels were not only well-adapted for the shallow coastal waters; they were also numerous. In peacetime the major seapowers possessed only a few vessels for inshore work, but the Russians did not rely upon building such craft after the outbreak of war. They kept up to 200 motor torpedo boats and 300 motor gunboats and patrol launches in service prior to 1941. Notwithstanding heavy losses, the figures at the end of the war might even have been higher.

Today

Today Soviet Russia has an estimated 1,000 motor torpedo boats, motor gunboats, coastal submarine chasers, and patrol launches. Britain is the only NATO seapower which owns light naval forces that might operate in Russian coastal waters, if any nearby bases could be secured; and the new West German Navy also may include such small craft. All other NATO Powers, and above all the United States

Navy, have neglected to build more than a few experimental small craft in peacetime.

Therefore, the bulk of the responsibility for coastal warfare near a Russian-controlled shore may fall upon the Royal Navy, which not only has some suitable ships, but also has knowledge of that particular type of naval warfare. Nevertheless, from German experience during the last war, it can be said that more small craft should be available, and that a shallow draught, armored, and heavily armed motor gunboat (guns and rockets) should be developed.

Although the Soviets may not make full use of their strong coastal forces in offensive sweeps, they certainly will defend to the last the approaches to Russian coastal waters and the main ports and naval bases. Allied losses when trying to penetrate the Russian maritime perimeter will be high, and such operations will need well-placed bases and air supremacy over the land-based Russian Air Force.

Admiral Napier, in 1854-55, had only three requests to address to the British

Government—sailors, pilots, and gunboats—but none could be satisfied before the war was over. The results of his naval operations remained, therefore, very unsatisfactory.

During World War I, the German Navy suffered from the lack of small gunboats, while the British Navy, during the intervention, had to use some river gunboats. However, this was a typical emergency solution only. Finally, from 1941 to 1945, German naval officers complained bitterly about the lack of suitable craft, which was not overcome up to the time of the German capitulation.

The same problem has turned up each time operations have had to be undertaken in Russian coastal waters; and, although a saying goes that nothing is ever learned from history, in the end there must be some exceptions. Soviet coastal craft may use small and hidden bases, and when dispersed, they do not form interesting targets for atom bombs. To combat them similar craft will still be needed, if possible in larger numbers.]

The Military Establishments of Eastern Europe

Digested by the MILITARY REVIEW from a copyrighted article in "East Europe" May 1958.

NEITHER the "thaw" which followed the death of Stalin, nor the "liberalization" engendered by Soviet Party chief Khrushchev's denunciation of the dictator, permeated the administration of the satellite armies to the extent that they did civilian life in the various Communist bloc countries. It was not until the events of October 1956—the rise of Gomulka in Poland and the Hungarian revolt—that any significant changes occurred. Since that time, while the military establishments of the other satellite countries have stood relatively still, those of Poland and Hungary have moved, respectively, away from and toward "Stalinization."

Reform in Poland

The license of Soviet troops on Polish territory was curtailed considerably by a joint Polish-Soviet statement issued from Moscow on 18 November 1956, and by an agreement signed by the Foreign and Defense Ministers of both countries on 17 December 1956. The latter agreement reaffirmed and particularized the Moscow statement; the following were the key points:

The location and number of Soviet Army units in Poland will be determined by agreements signed by both sides. Their movement, beyond the bases expressly as-

signed to them, requires the permission of the government of the Polish People's Republic. . . . Members of Soviet Army units stationed in Poland and their families are bound and required to respect and abide by the rules of Polish law. . . . The time, route, and order of Soviet Army units' transit movements through Polish territory will be determined by agreements signed by appropriate representatives of both countries.

Before the October events Poland's army was utterly under the domination of the USSR. The Commander in Chief, Marshal Rokossovski, was a Soviet citizen, as was his Chief of Staff, General Bordzilovsky. Hundreds of Soviet officers with "Polonized" names and vague claims of Polish ancestry held all responsible positions, and textbooks and tactics invariably were modeled on those used by the Red Army. After October, however, most—but not all—the Soviet officers were sent home. Marshal Rokossovski lost his position on the Politburo and his place as Minister of Defense and commander in chief. He was succeeded in the last two posts by General Marian Spychalski, a close friend of Party chief Wladyslaw Gomulka, and one of the Communist political generals who had been imprisoned in the Stalinist era. The position of army chief of staff still is held by a Soviet officer, but his two deputies are now Poles. Similarly, Soviet generals have been replaced in most command posts by genuine Polish officers.

The liberalization process continued in depth after October and applied even to many former members of the AK, the underground anti-Nazi army whose members previously had been discriminated against by the regime, with power and privilege going exclusively to the wartime Communist underground organization. This "rehabilitation" for large numbers of those whose war effort had been associated with that of the West appears to have con-

tinued, even in the face of the recent strengthening of Polish-Soviet ties.

An instance of "liberalization" is the greater degree of army freedom from supervision by the state security organs. A draft bill, read to the Parliament on 30 December 1957, was explained over Radio Warsaw on the same day as follows:

The changes [encompassed in the bill] are based on the principle that investigation should be conducted exclusively by the military prosecutor's office. The possibility of investigation officers of the security organs being able either to initiate or to conduct investigations is eliminated.

Regression Elsewhere

No program of reform similar to that in Poland has been undertaken in any of the other satellite countries. The Romanian, Bulgarian, and Albanian Armies have undergone no appreciable "liberalization," and in Hungary there has been a move in the opposite direction in the reorganized military forces. In that country the Soviet occupying troops are, of course, supreme, and there is no toleration of even the slightest step toward the creation of a national-minded army. It obviously would be ludicrous for the Kadar regime to claim demonstrated and active loyalty to communism for the prrevolt army, part of which went over to the insurgents while the rest remained passive in the uprising.

The regime merely attempts to explain away the army's unwillingness to oppose the freedom fighters—and, indirectly, the Stalinists' inability to control Hungarian troops in the emergency—by so-called "treachery" in the ranks. Typical of such explanations was an article in the official Party organ, *Nepszabadsag*, on 28 September:

Had it not been for the helpless and the traitorous in its midst, the People's Army could have proved what force it represented in the People's State. Imre Nagy

and his group, who betrayed the people, betrayed the People's Army as well. There are several hundred examples proving that the units of the Hungarian People's Army stood their ground in defense of our people.

The journal did not cite these examples.

Details are as yet scarce and vague on the reorganization of the army, but an indication of the regime's efforts at recruitment propaganda may be found in the 15 September 1957 *Nepszabadsag* description of a group of draftees from the village of Szalkszententmarton on their way to join the forces. The young men came in "beflagged cars," their arrival greeted by gypsy orchestras, according to the newspaper which also stated that "the villagers and onlookers danced in celebration."

In Czechoslovakia, the heritage of Stalinist Defense Minister Alexej Cepicka (dismissed from office in April 1956) remains, although some of his personal trappings, such as photographs of himself on barracks walls and military calendars, are gone. On 27 April 1956, *Rude Pravo* (Prague) scored Party work in the army under Cepicka as showing "incorrect working methods, personality cult tactics, immodesty, and isolation." Certain minor reforms were introduced, such as a loosening of furlough restrictions for enlisted men, but the servility of the army to the Soviet Union was quite unchanged, especially after the Hungarian revolt. At that time there was concern that the uprising would spread to Czechoslovakia, and since then even closer surveillance has been maintained on the troops.

Troop Relations

Perhaps the most noticeable of the changes which have occurred in east European relationships since the death of Stalin has been the improvement in the public manners of Soviet officers in dealing with their counterparts in the satellite armies. Politeness and at least sur-

face respect are now the rule, and any table-pounding orders from Soviet military men currently are delivered in private. This new "correctness" has been especially manifest since the events of October 1956 and is, as would be expected, nowhere more apparent than in Poland. Under Marshal Rokossovski, the Polish officers were a caste apart and below the Soviets, subject at any time to disdainful commands and rebuffs.

Similar liberties with nationalist feelings of the subject peoples were taken in Romania by Soviet officers who continued to behave as conquerors long after the end of the war. Even in Bulgaria and Czechoslovakia, where the USSR had no troops present in mass, the Soviet "advisors" and military missions had living quarters, rations, and special shops so far superior to those of the local population that it caused boundless resentment. These conditions have now been either corrected or better concealed. If Soviet officers retain their full privileges and attitudes, they do so in a far more circumspect manner. However, the arrogance and the insistence on special treatment of Red Army officers is long-standing and not confined to their relationships with satellite citizens.

An article in *Red Star*, the organ of the Soviet Army, summarized on 21 August 1957 over Radio Moscow, highlighted not only the age-old military problem of "distance" from subordinates, but also the rather special "primadonna" personalities of many high-ranking Soviet officers. After stating that "soldiers complain that some commanders display inflexible exactness and cruelly punish infringers of military discipline," the broadcast averred that "such exactness should have nothing in common with rudeness." On the subject of officers' privileges is said:

The officers' practice of using various dining rooms in accordance with their military rank has been resolutely criticized

in the army, because higher ranks were thus artificially separated from the lower ranks and communication was made impossible. However, here and there the determination to preserve these social barriers has been noted. In the headquarters of the Transcarpathian Military District, for instance, the officers merely removed the door signs indicating which ranks were to use the rooms. But the situation has not changed. Generals and colonels continue to dine only in their 'own' rooms. In some rest homes in the Transcarpathian District separate beaches are marked off for higher and lower ranks. Special premises, which usually remain empty, are assigned in officers' homes of this district for higher commanders.

Are such special privileges necessary? Do they contribute to closer relationship between commanders and their subordinates?

It is definitely time to abandon all those features which do not spring from the requirements and nature of military services, but artificially separate higher and lower ranks.

Soviet Aloofness

With such privileges common, at least until recently, even in the USSR, it is not surprising that Soviet officers behaved undiplomatically, and on many occasions rudely, during their tours of duty in the satellite states. From all reports they are still keeping to themselves in the various countries, in spite of the fact that their outward actions are far more proper. The Soviet troops, too, have little personal contact with the satellite peoples, although this may be partially their own or their superiors' decision.

The Red Army behaved so badly immediately after World War II that in most cases its members are still shunned by the local populations, although the conduct of Soviet soldiery (except, of course, in Hungary) has improved much since then. In lieu of actual social contacts between the

Red Army and the civilians of the satellite states there is an unremitting propaganda campaign centering on the valor and kindness of the Soviet soldier and the debt of gratitude owed him for "liberation" from the Nazis.

There is also little fraternizing between Soviet and satellite troops. The different languages form a natural barrier, but even so there has been no indication that the Red Army commanders would like closer relationships between their own and the satellite enlisted men—in fact, quite the contrary. It is important to note, however, that during the Hungarian revolt, many Soviet soldiers were reported as reluctant to take up arms against their rebelling "fellow workers." A small but significant number of Red Army individuals actually went over to the "counterrevolutionary" side, and it finally was necessary to reinforce the Soviet troops with freshly imported non-European elements who presumably felt less kinship with the Hungarians.

Military Budgets

No trustworthy accounts of the military budgets of the satellite armies are available. All published figures are pruned carefully to fit predetermined estimates and propaganda claims of restrained armament. Furthermore, there are no institutions in Communist countries comparable to democratic parliamentary committees to challenge budgetary statistics released by administrative organs; direct Soviet military aid is often minimized or hidden; and military expenditures habitually are concealed under "police" budgets and under those of the various ministries, particularly the ones dealing with heavy industry.

For example, in Czechoslovakia the Ministry of Building Industry is said to finance barracks construction and the Ministry of Chemical Industry to bear much of the cost of producing explosives. However, the figures (representing billions in

the local currencies) released in the official bulletins of the various countries for the year 1957 are shown in Figure 1.

These "statistics" reveal that the regimes keep the publicized portions of their military budgets somewhat under 10 percent of the "total" expenditures. The disproportionate lowness of the Hungarian figures were due to the revolt and subsequent breakup of the local army; the main cost of the military establishment in Hungary following the uprising was, of course, borne by the USSR. In the previous year (1956) the Hungarian regime claimed total expenditures of 42.2 billion

lotments to "defense" strain credulity, as do similar statistics released by the USSR.

Armaments Industry

In the Socialist countries arms are produced by state factories, according to the needs of the army, under conditions of maximum secrecy. The enemy must know as little as possible; it is well if he should be surprised at the decisive moment.

From the above quotation in *Zolnierz Polski* the difficulty in obtaining a comprehensive survey of satellite war production may be seen. Added to the uncertainties created by this official policy of

Official Statistics on Budgets

	Total Expenditures	Military Expenditures
Czechoslovakia	97.9 koruny	9.3 koruny
Poland	139.3 zloty	10.2 zloty
Romania	43.7 lei	3.7 lei
Bulgaria	18.4 leva	1.5 leva
Hungary	51.8 forint	1.9 forint

Note.—It should be kept in mind that Communist state budgets are in no way comparable to those of Western countries: they include expenditures for the "national economy."

Figure 1.

forint, military expenditures of 4.1 billion. In the past five years there has been a trend toward reduction of the published figures by two or three percent. Thus Poland in 1954, while spending more (10.6 billion zloty) on the armed services, had a smaller total budget (103.4 billion zloty). Poland's 1958 military budget, however, is slated to be 20 percent higher than in 1957 because of "increased costs." Bulgaria devoted 11.4 percent of her total expenditures to "defense" in 1954, 11.1 percent in 1955, 8.8 percent in 1956, and 8.3 percent in 1957. Some of these decreases, doubtless, reflect tendencies toward reducing costs in the military and in heavy industrialization in favor of an increase in living standards. Nevertheless, figures showing such relatively minor al-

concealment is the relative ease with which most establishments in heavy industry may be converted to war production. Nowhere was this better exemplified than in Poland, whose armament contributions to the Communist side during the Korean war were on a very large scale. Yet the regime did not find it necessary to admit the resultant dislocations of the economy until 16 August 1956.

At that time Edward Ochab (then First Party Secretary, now Agriculture Minister and still a Politburo member) stated that his government, in responding to the "imperialist" attack on Korea, had spent millions for the defense industry and transferred its best workers and machines there. He went on to say that the Party leadership was correct in building the de-

fense industry, but, alas, was wrong not to come to the working class at the time and tell them of the changes made in the six-year plan. The sections of this speech dealing with the Korean war were broadcast over Radio Warsaw on 16 August 1956, but deleted from the *Trybuna Ludu* text of the address.

In spite of the difficulties, however, certain general and many specific facts about satellite war production are known. Most importantly, the policy of emphasizing heavy industry inherited from Stalin, de-emphasized briefly under Malenkov and reinstated in somewhat milder form under Khrushchev, continues to hold sway throughout the area. The military leaders, of course, favor concentration on "producing the means of production," for the fruits of this policy—as exemplified in the USSR—have meant more war industry and a simultaneous enhancement of authority and prestige for the military.

As might be expected, Czechoslovakia, the most industrialized of the satellite countries, and Poland, which has made large strides in industrialization since the war, now are able to produce a significant share of their own armaments. The latter country is helped especially by the factories taken over from the Germans in the Oder-Neisse territories. Military items produced in Poland include trucks, tractors, cannon platforms, armored shields, and explosive materials; in Stalowa Wola, Rzeszow, and Radom there are apparently antiaircraft, machinegun, and tank factories, according to the exile publication, *Dziennik Polski* (London), 25 May 1954. General Spychalinski has stated that Poland now possesses "a modern network of airfields, warehouses, and magazines, as well as other military facilities." The same newspaper, *Trybuna Ludu*, later gave the following account of one section of the aircraft production industry:

The Polish aircraft industry is producing powerful jet fighters based on the

models of the Soviet MiG... LIM-1 and LIM-2 are by no means the latest word in modern jets, yet they attain the 'modest' speed of 646.22 miles an hour and a ceiling of over 45,000 feet....

The article also mentioned the production of "training and tourist" planes and gliders.

Two Polish shipyards apparently work exclusively for the navy. One in Gdynia has both construction and repair sections; the other in Oksywie is for repair and small naval craft construction only. Jet fighters, modeled on the Soviet originals, are manufactured extensively in Czechoslovakia. Bombers produced in local factories include the *Ilyushin II* and the *TU-4*, based on the Soviet copy of the United States *B-29*. *T-43* and *Stalin III* tanks are manufactured in quantity. There also is an extensive small-arms industry in Czechoslovakia, as well as precision tools and explosives factories which supply the USSR and, to a lesser extent, other member countries of the Warsaw Pact.

The armaments industries in Hungary, Romania, and Bulgaria are considerably less significant, and, therefore, the information available is vague and unreliable. It is known that all the countries depend on the Soviet Union for their heavy arms and their aircraft, which consist principally of obsolete USSR World War II models. Considerable quantities of light arms are manufactured in Hungary, and there are light cannon factories in Diosgyor and Gyor. An aircraft factory is located in the Romanian town of Stalin (formerly Brasov), but its production is probably not large nor very up-to-date. Bulgarian factories supply little in the way of armaments. All Black Sea naval craft appear to be built in the Soviet Union.

Labor Battalions

A common feature of satellite army life is the impressment of regular troops in

work units to provide manpower for state farms and collectives and for building military installations, bridges, and roads. These troops often join "agricultural" and "technical" battalions which perform this type of work throughout their period of service.

Exact figures on the strength of these "volunteers" are difficult to determine. This is due not only to the unreliable quality of most statistics released by Communist states, but also to the semantic confusion in ascertaining whether many units nominally termed "engineering" forces are legitimately so. Also the regimes sometimes are reluctant to call such formations "labor battalions," apparently because of the memories of similarly termed units under Nazi domination during the war.

In all the countries labor brigades, whether so termed or camouflaged under other names, are composed to a significant extent of "uncertain" elements of the young male population. These may be political dissidents, young men of "bourgeois" background, or members of minority groups. Thus citizens of Turkish ancestry in Bulgaria seldom are placed in regular units and those of German background in Czechoslovakia often are assigned to "technical" pick-and-shovel formations.

The open use of military personnel in the more grueling forms of civilian endeavor was brought out by the following comments over Radio Prague, 2 October 1957.

One month ago the military-technical unit at Orlova received the Order of the Republic, a distinction well-deserved. The soldiers of this unit extracted more than 72,000 tons of coal over and above what was planned during the first half of 1957. The Czechoslovak Army had been instructed to recruit this year [1957] 2,800 soldiers for mine work. It has, in fact, exceeded this quota by enrolling 3,300

soldiers for our mines, and recruitment continues.

This year's harvest, delayed by bad weather, was saved with the help of soldiers. In August for instance, an average of 5,000 to 9,500 soldiers helped daily to gather the harvest from our fields. We also could mention the tremendous assistance given by our soldiers on the occasion of various natural catastrophes or the tens of thousands of hours worked by our soldiers in the town-embellishment campaigns.

Premilitary Training

Not only is conscription universal throughout the area, but quasi-obligatory premilitary training is the rule also. This training, which is regulated by special acts of the various "parliaments" as well as by decrees of the Defense, Education, and Manpower Ministries, takes place in the schools, in the apprenticeship centers, and especially in certain mass youth organizations. In Czechoslovakia for example, the Union for Cooperation with the Army with over 700,000 members, male and female, provides drill in the use of arms, flying, parachuting, nursing, and civil defense. The Czechoslovak Communist Youth League similarly stresses some aspects of premilitary training.

Although there is a small amount of military drill for pre-high school age students in the satellite countries, serious training does not begin until two or three years before the induction age. This varies in all the states from the ages of 18 to 23, depending on the youth's educational status and the available manpower supply. The Polish law on premilitary training adopted 25 February 1948 is typical of areawide rulings on the subject. It states that all citizens of both sexes must undergo preparatory military training from the age of 16.

Special attention is devoted to university students who are expected to supply cadres for the reserve officer corps. Mili-

tary study centers, attached to each institution of higher learning, enable young men to secure reserve army commissions without interrupting their civilian studies, thus assuring a flow of educated specialists to every division of the state apparatus and economy without the loss of years entailed in full-time military service. The sources are by no means superficial, demanding in Poland, for example, 16 to

boards are reported to begin their compilation of material on the potential soldiers three years before induction. This material is supplied by local officials, Party members, youth groups, and educational functionaries. Relatively unschooled peasant youths are preferred in the ranks of the regular army. Bourgeois background, membership in "nationalistic" minorities, and intellectuality unchanneled along



24 hours per month as well as a yearly 30-day training period in the field.

A distinctive feature of the bureaucratic mechanics of the preinduction period is the procedure of "examination" devoted to the background of every youth before his military assignment. Those whose activities—or whose relatives' activities—classify them as "politically unreliable" usually are placed in labor units. This procedure is followed more closely, of course, in the states under more Stalinist regimes.

In Bulgaria, for example, the draft

Marxist lines, tend to lead to enrollment in a labor battalion.

Special schools to train career officers have been set up in all the countries. These military academies are divided into separate units according to the type of training provided. In Czechoslovakia there is a military academy in Prague which trains line officers and awards academic degrees to its graduates, a Military-Political Institute in the same city to train political officers, and a Military-Medical Academy in Hradec Kralove. At another Prague school, the Klement Gott-

wald Military Academy, the "political tasks" of commanders are stressed. At this academy, according to *Obrana Lidu*, "every commander must be the political leader of his subordinates, must always know in every situation how to cement the political and ideological unity of his subordinates."

Lower-level military schools in Czechoslovakia include a technical air force institution in Liberec, a tank school in Decice, and communications training centers at Nove Mesto and Vahom.

The other satellite countries have similar institutions, and there is some interchange of students between the various states. In Warsaw the General Staff Academy for graduate officers stressed scientific studies in the field of military science, based on the leading science of Marxism-Leninism and the experiences of Soviet military science. All political academies in that country were headed by Soviet officers until the Gomulka regime took power. Now both the staff personnel and the textbooks have been, to a significant extent, purged of their predominantly Soviet coloring.

Military Life

The army years in the life of the satellite draftee are grim ones. His work is rigorous, his living conditions poor, his food sparse, and his pay almost nonexistent. His term of service, though limited by law, also can be extended at the will of the regime, for there is no recourse from arbitrary decisions at the top level.

Polish regulations state that the term of compulsory service in the army is two years, in the air force and navy three years, and in the security forces 27 months. Reservists may be called to participate in military maneuvers once each year, and the maneuvers may be of no more than two months duration, unless extended for "important reasons" by the Minister of Defense. Individual reservists normally

are not called out each year. These regulations are fairly typical of those in other countries in the area.¹ After the October 1956 upheavals and the ascension of "national" Communist Spychalski to army leadership in Poland, there were plans to reduce terms of compulsory service by about one-third. However, thus far the reduction has not been put into effect.

The separation between officers and enlisted men is extreme, and Old-World concepts of rigid divisions between noncommissioned officers and privates are carried to a much further extent than is now general in Western military services. Nowhere are the differences in rank more glaring than in the pay scales. In the Bulgarian Army, for example—according to a reliable refugee report—a battalion commander receives 1,200 leva² per month, a company commander 900, a platoon leader 750, a master sergeant 650, and a private 1.80 to 4 leva per month, depending on his length of service. (One United States dollar equals 6.8 leva.) Huge pay differentials are a long-standing policy of satellite armies. In 1952 for example, Hungarian military wage rates ranged from 60 forint [\$5.10] per month for a private to about 6,200 per month for a division commander. In Communist armies a private's pay is nominal, and even the minuscule sums he receives used to be and, in some cases, still are, liable to deductions for youth group membership dues and "voluntary" contributions to state loans.

Food and living quarters vary from country to country, and within the countries, with the specialized troops enjoying much the better conditions. Czechoslovakia, whose prewar economy was the most advanced in the area, continues to pro-

¹ Officially, Czechoslovakia and Romania have across-the-board enlistment periods of two years for ground troops. According to exile reports this service may be extended another year. Bulgaria and Hungary demand two-year enlistment periods for infantry troops, three years for the air forces.

² The legal minimum wage for industrial workers in Bulgaria is 400 leva per month.

vide her soldiers with comparatively good quarters and sufficient nourishment. Bulgarian troops, on the other hand, are meagerly fed and, according to reliable reports, receive only two meat meals a week.

Punishment

In a satellite country the ordinary soldier who runs afoul of his officers is as helpless as the ordinary civilian under the jurisdiction of Communist courts of law. The familiar monolithic authority, with Party military leaders sharing in the Party civilian ruling hierarchy, makes a mockery of the "safeguards" provided by law. Thus under normal circumstances a biased decision by a lower military court will be upheld in appeal by a higher court with the same bias. A lawyer assigned the defendant will have the same "safe" motivations as the judges. Under these conditions there is little real importance in the fact that a lawyer for the defense is obligatory in all serious cases in each country and that decisions may be appealed within three to eight days, depending on the country involved.

Wide latitude for sentencing is provided the military courts in each country. For example, minimum sentences for absence without leave for under six weeks may be punishment by six months in prison in Czechoslovakia or two years in Bulgaria, but in these and all the other countries, the same offense in "qualified cases" may range legally up to 20 years. It is, of course, the court's own decision as to whether the case is "qualified." The "crime" of insubordination equally is all-encompassing and may be dealt with by the courts of all countries far more severely if the defendants appeared to have been acting in concert.

For mild infractions of military rules such as weapons not properly cleaned, drunkenness, or small thefts the soldier may be sent to a disciplinary labor battalion, his length of stay there being determined by his company officers.

Morale

Under the conditions prevalent in satellite armies, the morale of the ordinary enlisted man can hardly be high. Not only is his work grueling and almost unrecompensed, but he is constantly faced with discriminations. He sees his officers and high-ranking noncommissioned officers enjoying pay rates literally hundreds of times greater than his own, as well as privileges which include special stores with stocks of merchandise he would not be permitted to buy, even if he could afford them.

Unlike the enlisted men in Western countries, satellite soldiers cannot accept their inferior privileges and situations as temporary conditions of military service. The higher caste status of the army hierarchy is a precise reflection of the status of the ruling bureaucracy in civilian life. Furthermore, the officers are not a group set apart from the civilian officials, but, as Party members and regime leaders, a part of the regime itself. Thus no recourse from their rule or their excesses is available.

Enlisted *Esprit*

The enlisted man also is well aware that favored branches of the service, such as the security forces, are not only better paid, but far better housed, clothed, and fed. In all probability the ordinary draftee has not even the Communist *mystique* to uphold him, for if he were a fervent Party member or had distinguished himself in subservience to the Party's will, he would very likely be an officer or, at any rate, in one of the more rewarding branches of the service. Indeed, this separation of the ordinary soldiery from what might be termed the elite troops gives rise in many instances to real class hatred. The attacks on the security police by the young people of Hungary during the revolt and the present vast unpopularity of the Polish militia are cases in point.

Another source of discontent in the

ranks is agricultural collectivization. The peasant soldier, dreaming of his army discharge and return home, can only be appalled at the upheaval of his family life, the obliteration of farms which, in many cases, his forebears have worked for countless generations. Each new collectivization campaign undoubtedly is greeted with resentment by substantial numbers of ordinary soldiers.

Similarly, the industrial worker drafted into the army—and he may well have been formerly a peasant “recruited” into the factories during the industrialization campaigns—can look forward only to a civilian life in towns whose overcrowded housing conditions have not kept pace with the industrial buildup.

The soldier's morale also is undermined by worry about his family's financial plight. Both in the countryside and in the industrial settlements, the east European family depends, often to a crucial extent, on the working and earning power of its young men. Their induction into the army is frequently a source of extreme hardship to the average family. The regime does not provide any allotments for dependents of the soldier as is the case in the American Army and to an extent in other military services. Only in the case of “inability” to work—a condition decreed, of course, by Party officials and seldom extending further than financial aid to mothers of several children—will financial aid be given to the families of soldiers. Otherwise it is areawide policy to force the entire adult population into full-time employment, including the soldier's immediate family.

Tradition

From a military point of view, perhaps the most morale-deadening factor in the

satellite armies is their emptiness of tradition. Lacking a past—for the regimes dogmatically posit the condition of their national prewar armies as “feudalistic” or “fascistic”—the armies must make do with the unhappy present or, as in civilian life, with the promise of a future nirvana. Unlike professional armies throughout history they cannot build *esprit* on past glories. Unlike even the Soviet soldier, they are not permitted to hark back to national armies “safely” far in the past for victories fought on terms “progressive for the time.” Even this “judicious” kind of nationalism is forbidden in the satellite countries.

Since most of the territory in the area was “liberated” after World War II by the Soviet Army, and since the people's own resistance efforts often were tied to those of non-Communist nationals now in exile or in disgrace with the regimes, there is little in the last two decades on which to construct Communist—as distinct from nationalist—army morale. The only recourse is to borrow *esprit* from the Red Army, an operation somewhat more difficult than “borrowing” Soviet advisors or even armaments, given the nationalist state of mind of the non-Communist populations of central and eastern Europe. Further, the satellite armies are precluded, by the servility of the regimes which master them, from even the anticipations of great victory or national conquest.

The mere contemplation of such an eventuality is unallowable for in the present composition of military affairs in the satellite countries, all strategic planning is controlled by the fact that the separate national forces can never be more than appendages of the Red Army.

The Centerpiece--A Study of Nuclear Warfare

Digested by the MILITARY REVIEW from an article by Colonel
A. J. B. Bailey in the "Canadian Army Journal" April 1958.

WHETHER tactical and intercontinental strategic nuclear warfare will ever be divorced completely cannot be forecast, but it does seem possible that warfare in which only tactical nuclear weapons are employed may occur—either in "small wars," purposely kept outside the confines of the major powers, or as a prelude to or an aftermath of the strategical nuclear holocaust.

Tactical nuclear warfare will be fought by formations of infantry, armor, and artillery, the latter to include the nuclear delivery systems and their warheads. The delivery systems may be organic to the ground force formations or they may be attached for specific operations, but the warheads, which are the tactical nuclear weapons, will be allotted under strict control according to their availability and to the importance of their immediate employment.

The term "tactical nuclear weapon" is difficult to define precisely since there is no clear division between the various yields of warheads relative to their employment on the battlefield. A definition which suits this study, however, is that a tactical nuclear weapon is one which can be employed with safety in proximity to friendly forces. "Proximity," in this sense, is the distance between the center of the target and the foremost friendly forces—a distance which must be traversed quickly by friendly forces moving up to take advantage of the nuclear effects upon the enemy.

Because this critical distance must be kept to a minimum, the yield of the warhead which it is safe to employ is limited by the mobility of the friendly forces. In turn, this may limit the size of the nuclear delivery system and increase its mobility.

Formations of all arms, formed into

battle teams of various sizes, will comprise the bulk of the field army on the battlefield, but the centerpiece—and the most important element—will be the nuclear delivery system and its warheads. Around the delivery system will revolve all other elements of the ground forces, for they exist solely to protect it and to maneuver the enemy into a nuclear killing ground where the warheads can be employed to the best advantage. This is a logical outcome of the development of tactics since a nuclear weapon of even the smallest yield has latent destructive power equivalent to a large force of infantry, armor, and artillery. This destructive power must be husbanded so as to be employed with battle-winning effectiveness at the critical time and place.

The delivery system may be a gun, a rocket, or a guided missile which, with its warheads, constitutes the most powerful element in the hands of a commander. He must ensure that the delivery system and its warheads are protected and concealed, that they are positioned within range of his probable targets, and that they are employed when he is certain that a suitable target has been presented.

Protection

The absolute protection of the delivery system and its warheads is vital. Close protection is required to deny the enemy reconnaissance of the assembly areas and launching sites by ground and air, and to prevent penetration by patrols. Penetration by a small fighting patrol, for instance, for the purpose of destroying some or all of the delivery system and/or its warheads would be a venture, the value of which would be out of all proportion to the effort expended by the enemy. For the loss of a few men the potential of a

large battle group of all arms could be destroyed by detonating only one small warhead.

In arranging the close ground protection of the delivery system site the commander will be required to allot a proportion of his battle team strength, sufficient to achieve the aims outlined above. In an *Honest John* type field artillery rocket system, for instance, the force required might be as much as a battalion size group of all arms deployed around the perimeter in a defensive position, complete with patrols, mines, and wire. The battle group also must be sufficiently mobile and have adequate reconnaissance elements to ensure protection when the delivery system is on the move in the advance or withdrawal.

Close air protection, both against direct attack aircraft and missiles and against airborne reconnaissance, must be arranged with a fast-firing, accurate, and mobile light antiaircraft gun or rocket or a small surface-to-air guided missile. This would be point defense of a vital area in its most important sense.

Concealment

Concealment is another very important aspect of close protection. By the cunning use of dummy and alternate positions, by cautious movement when visibility is poor, and by confusing ground surveillance radar by electronic countermeasures and other means the delivery system will have some chance of avoiding detection before it is required to be active. Having become active, the requirement will be immediate redeployment to a previously selected and reconnoitered position. Effective concealment will require a most imaginative plan and absolute adherence to it.

Ground Defense

Ground defense concerns the close protection of the delivery system and its warheads, the real protection of both will be provided by the battle teams and air defense systems in the forward areas. Bat-

tle teams in contact with the enemy will defend, attack, withdraw, counterattack, and advance in tactical maneuvers which are designed to force the enemy to present a suitable nuclear target.

Elements of the battle teams will be dispersed at greater distance than heretofore in order to avoid becoming nuclear targets themselves, but dispersion will not be so great as to allow the enemy to advance upon the delivery system undetected and unopposed. Every maneuver of the battle teams in the forward areas will be directed toward securing the area of the delivery system and its warheads and to setting up the enemy as a suitable target for the employment of a nuclear weapon. As before, the initiative must rest in our hands; if we begin to conform to the enemy's desire, the opportunity to employ our nuclear resources effectively will never be presented.

The air defense systems required to provide long-range protection of the delivery systems and their warheads will be part of an over-all air defense plan for the army area. It will comprise radar for the detection of approaching aircraft and missiles, and surface-to-air missiles for the destruction of these airborne carriers. The most dangerous elements are the airborne reconnaissance vehicles, whether they be aircraft or missiles. These must be destroyed before they can investigate the areas in which the delivery systems are deployed, because even the best concealment and deception plans can be defeated by powerful, long-range infrared cameras.

Positioning

Having ensured the protection of his nuclear weapon, the commander must plan its employment. The most vital factor in this problem is to make certain that the delivery system is positioned so as to be within range of the targets he desires to engage. This problem is similar to that of all field artillery commanders but is slightly more complex.

An *Honest John* rocket system, for instance, has a maximum range of about 17 miles. Thus the launching sites for the rockets must be positioned not more, and probably less, than 10 miles from the forward troops so as to ensure sufficient usable range in enemy-held territory. The actual launcher is relatively small and quite mobile and is, therefore, not difficult to conceal and move quickly into its launching position.

There are other elements of the *Honest John* system, however, which are more difficult to move and conceal in the forward areas; for example, the assembly areas where the three portions of the rocket are brought together. Of the other delivery systems now in existence, some have shorter maximum ranges but are less mobile and others have longer maximum ranges. Newer systems will be smaller and more mobile for equivalent ranges.

Targets

There would be no point in securing the delivery system and its warheads or in positioning them in an ideal location if the warhead could not be used. The problem here is to find and fix a suitable nuclear target. In making his decision to employ a nuclear weapon, a commander will be influenced by such factors as the importance of the target to his own operations, the availability of delivery systems and the supply of warheads, the safety of any friendly troops in proximity to the target, and the time available and required to commit the weapon.

In general, a suitable nuclear target will be *made, not found*, because the enemy will be just as anxious to avoid presenting a target as we. The battle teams will attack and defend always with the aim of concentrating the enemy in the killing ground. Forcing the enemy to conform will require bold, imaginative, and cunning commanders with plenty of initiative, because the enemy will resist their efforts to the utmost.

Once concentrated into a killing ground within range of the delivery systems available to the commander, the enemy must be held there while the bulk of the friendly forces are withdrawn to areas outside the danger area of the nuclear weapon. This will require the most skillful handling if the enemy is to remain unsuspecting.

The stage is now set. An enemy force of sufficient size and importance to warrant a nuclear weapon has been concentrated in a nuclear killing ground; the undetected delivery system has been positioned and readied within range of the target; friendly forces have been warned and have employed protective attitudes; and a strong mobile battle team is organized and waiting to move into the target area. At this point, destructive power equivalent to many guns, tanks, and infantry is launched into the air and is directed toward the enemy. If the target is really suitable the result will be out of all proportion to the size and cost of the nuclear warhead used.

Appreciating the immense killing power of one small nuclear warhead and the size of the all-arms force which would be required to achieve a similar result, one will realize at once that the tactical nuclear weapon has become the dominant factor on the battlefield, whether we like it or not. Every action on the battlefield will be directed toward avoiding the creation of a nuclear target for the enemy and toward employing our own nuclear weapon against him.

Since the nuclear weapon is dominant, all maneuvers must be directed toward its protection and employment. The nuclear delivery system centerpiece, surrounded by strong, mobile battle teams of infantry, armor, and artillery, seems to be an accurate portrayal of the shape of things to come.

What the future holds, no man knows; but his plans must influence its course.

BOOKS OF INTEREST TO THE MILITARY READER

SPACEPOWER. What It Means to You. By Donald Cox and Michael Stoiko. 262 Pages. The John C. Winston Co., Philadelphia, Pa. \$4.50.

BY MAJ PATRICK W. POWERS, Arty

Regardless of WHO you are, WHERE you are, and WHAT you are, with the advent of Sputnik I, on October 4 1957, you became part of a great adventure and new world force—spacepower.

With this introduction, *Spacepower* goes on to predict the influence of space on history. The importance of this subject today might be compared to the influence of seapower on history as analyzed by Admiral Mahan in 1890. The approach is sobering and realistic yet the pace is rapid and stimulating.

The authors define military spacepower as "the ability of a nation or group of nations to exert their will via the *space medium*." They insist on a methodical program to dominate space for the next 40-odd years. Since most people are not convinced of the importance of going out into space, ample justification is given on the grounds of economic, psychological, political, military, scientific, and moral reasons. Complete timetables are shown on the evolution of putting man in space and space technology. A searching look is made into the impact of *Sputnik* on the free world's leadership, strategy-tactics, missile production, applied research, basic scientific research, our educational system, and democratic culture. The call is for deliberate and well-planned national objec-

tives to outmatch the USSR. This means not only the *why* of going into space, but also the *when* and *where*.

An interesting military discussion involves the counterspace battle. "The counterspace battle requires that an enemy be hit or killed primarily in space and not on the ground." The basis of this statement is that perpetually flying, nuclear-powered space vehicles will have to be destroyed in space and not on the ground. This is the first time that the natural habitat of a weapon system is entirely in space requiring a different orientation.

Who owns space and the universe? How far up do nations exert control? A problem arises at the end of the current International Geophysical Year when the "scientific" satellites will be looking down on other nations and perhaps monitoring their activities. Does this violate national sovereignty? If the Russians get to the moon first, can they stake a claim to it? Or will it be like the Antarctic where no nation has complete jurisdiction at the present time? These questions are answered by the authors by outlining a program to control space and create a code of space law.

This book is a unique coverage of the future of our acceleration into space. Its statement that ". . . the nation that masters speed and distance, coupled with staying power, will be in a position to dominate the world" is enough to justify a more detailed look into *Spacepower*. The military reader who enjoys a good round-table discussion will find this book stimulating and convincing.

THE COMPACT HISTORY OF THE UNITED STATES ARMY. By Colonel R. Ernest Dupuy. United States Army, Retired. 318 Pages. Hawthorn Books, Inc., New York. \$4.95.

BY LT COL RODGER R. BANKSON, *Inf*

Don't pick up this book if you expect to find an analysis of the great campaigns—or even the great battles—of American military history. The campaigns and many of the battles are there, but only as reference points. However, once the book is in hand, other work probably will suffer as the reader finds himself engrossed in a sweeping chronicle by a talented soldier writing about his favorite subject—the Army.

The author calls his book a history, and perhaps he is right. But the over-all effect is that of a fast-paced analytical narrative. He uses *what* happened to explain why and how it happened and to evaluate the results. With broad brush strokes, pointed up by a continuous parade of names, places, and events, he paints the picture of the Army from its beginning through its wars and periods of peace. The book is fast-moving but escapes becoming kaleidoscopic, as well it could have without the exercise of great care in compressing everything from the tactical lessons of the American Revolution to the ideological lessons of Korea into a single volume.

Colonel Dupuy does not overlook the problems and the faults, such as the arbitrary combat age limit in World War II, the "Momism" which (skillfully encouraged by Communists) led the Nation to wreck its magnificent Army in mass demobilization, and the softening of codes and the erosion of responsibilities.

Valuable to the student of history, interesting to anyone who is or has been a part of the Army, this volume might almost be considered essential reading for newcomers to the profession, for in its pages are many lessons for the career

soldier and the civilian who would understand the not perfect but always great United States Army.

A HISTORY OF SINO-RUSSIAN RELATIONS. By Tien-fong Cheng. 389 Pages. Public Affairs Press, Washington, D. C. \$6.00.

BY MAJ HARRY H. JACKSON, *Inf*

Dr. Cheng was a Minister of Education in the Chinese Nationalist Government. His book is written with a vested interest in the Nationalist Government and in the future of China. This position is reflected throughout his writing and colors the objectivity that is associated with unbiased history.

The account covers Chinese-Russian relations from the Mongol conquests of Russia in the 12th century to the present. Emphasis is on the period from the Russian Revolution of 1917 to the mid 1950's; an additional focus is on US-Chinese affairs. Modern Sino-Russian relations are enmeshed with contemporary Japanese and US policies toward China, and the author indicates this relationship by devoting much of his discussion to US policies and personalities involved in the tragic "China tangle."

Military force continues to play a vital role in Chinese history and the author takes into account the impact of military operations in his examination of Russia and China.

Dr. Cheng's unevaluated enumeration of strengths and loss figures plus his rather simplistic analysis of the cause and effect aspects of operations reduces the value of his work as a military source.

As another effort to shed much needed light on the rather confused saga of modern China this work has value. But it is not an unbiased historical account and selective facts and "case making" take away from the objectivity assumed from the title.

THE SOUTH IN THE REVOLUTION, 1763-1789. Volume III. By John Richard Alden. 442 Pages. Louisiana State University Press and the Littlefield Fund for Southern History of the University of Texas. \$7.50.

BY MAJ RICHARD L. WEST, CE

This is the third of a series of 10 volumes being prepared on the history of the South under joint sponsorship of the Littlefield Fund for Southern History and Louisiana State University.

Grenville's program for Colonial America, established by the British Parliament in 1763, and the Townshend Acts of 1767 created violent and unexpected opposition throughout the American Colonies. This great popular reaction for independence was totally underestimated and misunderstood by the British Government and led directly into the Revolution and subsequent formation of the Union.

This book covers the history of that portion of Colonial America which included Maryland, Virginia, the Carolinas, and Georgia during the "Revolutionary Period" beginning with the signing of the Treaty of Paris in 1763 and ending with the establishment of a Federal constitution.

The author traces the social and political evolution of the southern colonies, the part played by these southern states in the Revolution and the formation of the Union, and the early growth of sectionalism between the North and South which was to ferment for more than 70 years before it erupted into the great American Civil War. However, even by the early 1780's the maintenance of political balance between northern and southern interests was a matter of major importance.

The author weaves with great clarity a composite picture of the early South with its many divergent interests, competing factions, and economic and political pressures.

The book is a scholarly, well-written, and interesting piece of American history.

THE CLAY PIGEONS OF ST. LO. By Glover S. Johns, Jr. 257 Pages. The Military Service Publishing Co., Harrisburg, Pa. \$5.00.

BY LT COL MARK H. TERREL, Inf

Colonel Johns tells the detailed story of how the 1st Battalion, 115th Infantry, 29th Division, drove up from La Forge to capture St. Lo. The author describes his sensations and personal problems as commander of the battalion during some of the incredibly difficult hedgerow fighting that followed D-day.

With a perceptive eye for detail and a remarkable memory, he gives the reader the impression of being present in the battalion command post during the actions described. To one who has never commanded a battalion, this will be an illuminating description of unique problems; to one who has, it will be an interesting summary of some of the problems he perhaps would rather have forgotten.

The book is written in simple, clear English and does not go into the detail on maneuvers which frequently makes military narratives as hard to read as the battle was to fight.

It will appeal to several audiences: those who were in the 29th Division or in the area of St. Lo during the period described; those interested in knowing what goes on in a battalion command post; and, strangely enough, those interested in knowing what goes on in the Army.

It may be especially important to the Army—along with the few other books written about the battalion command level—because of the peculiar circumstance resulting from the recent reorganization of the Army. It will be of help to the infantry officer who is trying to prepare for battle group command experience.

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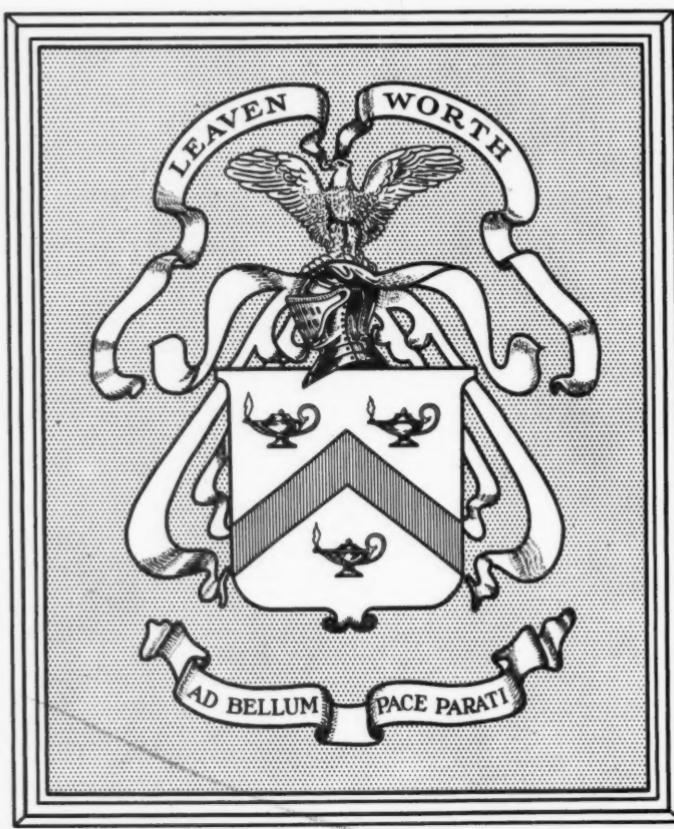
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